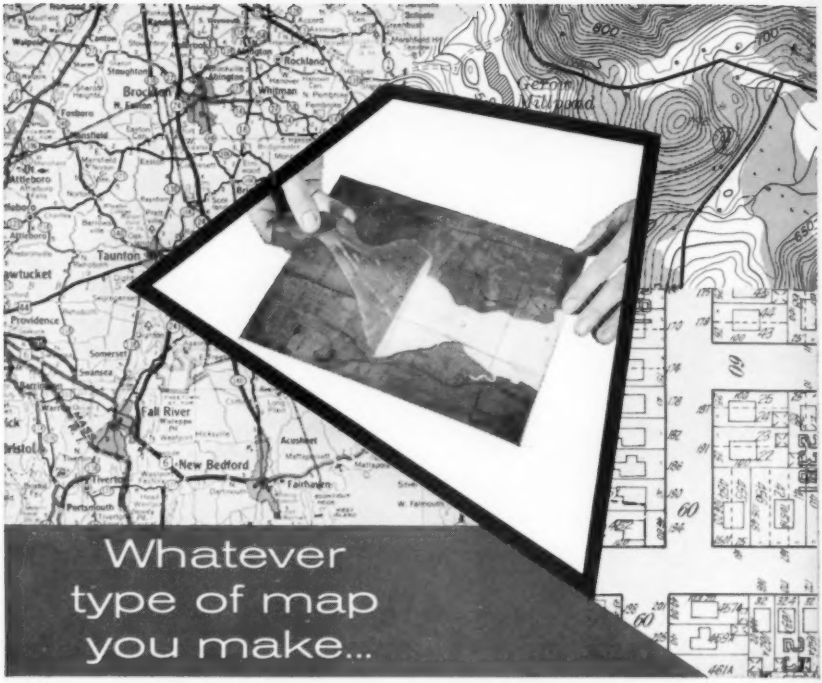
Surveying and Mapping

OF MICHIGAN
OCT 4 1961
ENGINEERING
LIBRARY

September 1961

Quarterly Journal
AMERICAN CONGRESS ON SURVEYING AND MAPPING



STABILENE® has the ideal surface

STABILENE Films for mapmaking are made in 27 versatile surfaces – each on an exclusive re-stabilized polyester base. This K&E-perfected re-stabilizing process guarantees maximum dimensional stability, allowing far greater accuracy than any other medium can give. Surface coatings are matched to work together for crisp, sharp results.

For Topographic Mapping – STABILENE assures sharpest lines, perfect duplication of scribes and halftones by time-saving etching procedures.

For Highway or Multicolor Mapping – STABILENE assures perfect register of color and line; offers a wide variety of films for conventional drafting or scribing methods, stripping films for tints and screens, photo-etching surfaces, etc.

For Municipal or Plat Mapping – STABILENE offers pencil and ink surfaces for layout; clear all-purpose film for overlays, additions, changes; black-line image films for durability, high-contrast.

Major STABILENE® Film Categories:

- Clear, with ink surface
- Matte drafting surface
- Scribe coat
- Peel coat
- Cut N' Strip
- Transparent scribe coat
- Diazo black line
- Diazo sepia line
- Diazo black line with scribe coat
- Diazo, non-reproducible blue sensitized
- Photographic emulsion, contact
- Photographic emulsion, reflex
- Wash-off sensitized
- Brownprint sensitized
- Photographic emulsion, projection
- Photographic, projection, on scribe coat, and peel coat

There are over 100 varieties of STABILENE® *products for mapping.*

K&E

KEUFFEL & ESSER CO.

NEW YORK • HOBOKEN, N. J.
PHILADELPHIA • DETROIT • CHICAGO
MILWAUKEE • ST. LOUIS • DALLAS
DENVER • SAN FRANCISCO
LOS ANGELES • SEATTLE • MONTREAL

KEUFFEL & ESSER CO., Dept. SM-9, Hoboken, N. J.

☐ Please send more information on the complete line of STABILENE® products for mapmaking.

☐ Have enclosed details of specific problem and would like your suggestions.

Name & Title: _____

Company & Address: _____ 4376

Organization of the Congress

OFFICERS FOR 1961

President

B. AUSTIN BARRY
New York, N. Y.

Vice President
&
Executive Secretary

WALTER S. DIX
Maps and Surveys Division, TVA

Treasurer

HENRY W. HEMPLE
U. S. C. & G. Survey, (Ret.)

BOARD OF DIRECTORS

(Terms expire 1961, 1962)

GEORGE C. BESTOR	1961
RALPH MOORE BERRY	1961
DUNCAN M. FITCHET	1961
VICTOR H. GHENT	1961
ROLAND H. MOORE	1961
ALFRED O. QUINN	1961
H. ARNOLD KARO	1962
JAMES L. BELL	1962
A. PHILLIPS BILL	1962
FRANK A. CLEMENS	1962
GRANVILLE K. EMMINIZER	1962
CLIFFORD A. THORPE, JR.	1962

PAST PRESIDENTS

ROBERT H. RANDALL
JOHN S. DODDS (Deceased)
GEORGE D. WHITMORE
FRANK S. BORDEN
MARSHALL S. WRIGHT
SOL A. BAUER
GERALD FITZGERALD
GEORGE H. HARDING
REAR ADM. R. F. A. STUDDS
CARROLL F. MERRIAM
LESTER C. HIGBEE
ROBERT H. LYDDAN
W. B. WILLIAMS
GEORGE C. BESTOR
REAR ADM. H. ARNOLD KARO

CHAIRMEN, TECHNICAL DIVISIONS

ROBERT J. BEATON, *Cartography*
JULIUS L. SPEERT, *Control Surveys*
JOHN O. EICHLER, *Education*
CLIFFORD A. THORPE, JR., *Instruments*
W. J. REESE, *Property Surveys*
DAVID LANDEN, *Topography*

CHAIRMEN, STANDING COMMITTEES

B. AUSTIN BARRY, *Executive*
JOHN M. AMSTADT, *Budget*
FRANK S. BORDEN, *Membership*
LESTER C. HIGBEE, *Professional Status*
A. J. WRAIGHT, *Publications*
HELMUTH BAY, *Public Relations*
JOSEPH P. DUNICH (*22nd Annual Meeting*)

ADVISORY COUNCIL

C. C. LINDSAY
W. B. WILLIAMS
WILLIAM C. WATTLES
J. S. BEAZLEY

PUBLICATIONS COMMITTEE

A. J. WRAIGHT, *Chairman*
FRANK S. BORDEN (*General*)
ROBERT C. ELLER (*Property Surveys*)
LYMAN D. LYNN (*General*)
C. S. MALTBY (*Instruments*)
MARVIN C. MAY (*Education*)
ROBERT L. MORAVETZ (*Cartography*)
H. P. KAUFMAN (*Control Surveys*)
EDMUND SWASEY (*Topography*)

NOTE—Manuscripts of articles should be addressed to Chairman Wraight, Coast and Geodetic Survey, Department of Commerce, Washington 25, D. C.

EDITORIAL STAFF

HOWARD S. RAPPLEYE, *Editor-in-Chief*
JOHN W. MARTIN, *Assistant Editor*

American Congress on Surveying and Mapping

The American Congress on Surveying and Mapping is a non-profit association, organized to advance the sciences of surveying and mapping in their several branches, in furtherance of the public welfare and in the interests of both those who use maps and surveys and those who make them. It aims to establish a central source of reference and union for its members, to contribute to public education in the use of surveys and maps, and to encourage the prosecution of basic surveying and mapping programs, especially those programs which are paid for, in whole or in part, with public funds.

SURVEYING AND MAPPING is the official journal of the Congress and is published quarterly during the months of March, June, September, and December. The Congress welcomes articles and interesting news items for publication in its journal. Manuscripts should be sent to the Chairman of the Publications Committee.

For further information, write to

ACSM Central Office, Room 430 Woodward Bldg.,
733 15th Street, N.W., Washington 5, D. C.

ADVERTISING IN SURVEYING AND MAPPING

To assist members to keep abreast of new developments in surveying and mapping instruments and equipment, and to afford suppliers of such items an advertising medium ideally suited for their market, the pages of SURVEYING AND MAPPING are open to commercial advertising. For rates and data, write to **Advertising Department, Surveying and Mapping (Schaler Butler Associates), 1028 Connecticut Avenue, N.W., Washington 6, D. C.**

INDEX TO ADVERTISERS

Abrams Aerial Survey Corporation 310
Advertising Department, SURVEYING AND MAPPING 373
AGA Corporation of America ..... 300 & 301
Wm. Ainsworth & Sons, Inc. 423
American Air Surveys, Inc. 417
American Paulin System ..... Cover 4
Aqua Survey & Instrument Company 304
Art-o-graph, Inc. 299
Bathey Manufacturing Company 302
Bausch & Lomb Incorporated 311
C. L. Berger & Sons, Inc. 315
F. W. Breithaupt & Sohn 299
Buff & Buff Manufacturing Company 318
Crown Metal Products Co. 400
Cubic Corporation (Electrotape) 319
E. I. du Pont de Nemours & Co. (Inc.) ..... 309, 316 & 317
Engineers Surveying & Calculating Service 417
Ertel-Werk 305
Fennel Instrument Corp. of America 422
W. & L. E. Gurley 296
Hastings-Raydist 306
Carl Heinrich Company 320
Harrison Marker (J. David Johnson) 390
Jacoby & Associates, Inc. 400
The Kelsh Instrument Company, Inc. 314
Kern Instruments, Inc. 321
Keuffel & Esser Company ..... 322 & Cover 2
Monsen Typographers, Inc. 303
OMI Corporation of America 308
Pacific Air Industries 348
Park Aerial Surveys, Inc. 400
Precision Instruments 345
Technical Advisors, Inc. 312
Tellurometer, Inc. 313
Ulano Graphic Arts 307
Unitech Corporation 305
Universal Instrument Company 304
Wild Heerbrugg Instruments Inc. .... Cover 3
Zeiss Aerotopograph 298

SURVEYING AND MAPPING is published quarterly by the AMERICAN CONGRESS ON SURVEYING AND MAPPING, Box 470, Benjamin Franklin Station, Washington 4, D. C. Yearly subscriptions to non-members: U. S. $5.00; foreign $6.00. Single copies $1.50 plus postage.

Entered as second-class matter at the Post Office at Washington, D. C., November 13, 1944, under the Act of March 3, 1879. Accepted for mailing at special rate of postage August 7, 1958. Additional entry as second-class matter at the Post Office at Lancaster, Pa.

SURVEYING AND MAPPING

Editor-in-Chief

Howard S. Rappleye

A QUARTERLY JOURNAL

DEVOTED TO THE ADVANCEMENT OF THE SCIENCES

OF SURVEYING AND MAPPING

Volume XXI, No. 3

September 1961

PUBLISHED BY THE

AMERICAN CONGRESS ON SURVEYING AND MAPPING

BOX 470, BENJAMIN FRANKLIN STATION, WASHINGTON 4, D. C.

ACSM CENTRAL OFFICE IS LOCATED AT ROOM 430, WOODWARD BUILDING,
733 15TH STREET, N.W., WASHINGTON 5, D. C.

A Guide to OP and VP

Gurley Optical Plummet

The Optical Plummet Transit opens new avenues in accuracy, speed and convenience...eliminates inconvenience and lost time involved in centering a plummet over a point.

The Optical Plummet is a telescope through the vertical center (spindle) of a transit. It will point vertically when the transit plate is level. The telescope is turned at right angles by a prism, so that vision is actually horizontal. Setting and adjustment may be checked very simply and precisely by rotating the instrument 180 degrees.

The Gurley Shifting Head Tripod permits 1¼" movement of the transit in two directions 90° separated, without material disturbance to the level of the plate (the Optical Plummet thus remains operative through the entire centering procedure).

Advantages of the Gurley Optical Plummet Transit

- Saving in set-up time, as much as 33%—a factor when a crew is waiting.
- Eliminates swaying plumb bob.
- More accurate centering over point.
- On construction work—sights on points some distance below, such as encountered in bridge work and building construction.
- Made in U.S.A.—Little servicing, but easily repaired when necessary.

Gurley Optical Plummet Transits Available in 21 Combinations

And with limb reading to 1 min.; or 30 sec., or 20 sec.... Stiff-leg or Extension-leg Tripods with Constant-Level Shifting Head and wide-frame European-type construction

With Circular Compass	With Trough Compass	Without Compass
OP-52	—	OP-57
OP-62	—	OP-67
OP-132	OP TC 137	OP-137

Variable Power

is standard on Gurley Transits and Levels

- Wide range of magnification with **one** eyepiece—zooms for near or distant objects
- Easily adjusts to suit weather and light conditions
- Built-in haze filter

At high power:
- longer shots
- less glare in bright sunlight
- increase in readability
- no glare...high contrast
- blacks and whites stand out

At low power:
- greater field
- brighter field
- decrease of heat waves

We will be pleased to send you further information about both Gurley Optical Plummet Transits and Gurley Variable Power Eyepiece.

Both Optical Plummet and Variable Power are patented.

W. & L. E. Gurley · 530 Fulton St., Troy, N.Y.

September • 1961

Contents

Volume XXI, No. 3

ORGANIZATION OF THE CONGRESS 293

INDEX TO ADVERTISERS 294

PRESIDENT'S MESSAGE 323

MAPPING ANTARCTICA 325
William A. Radlinksi

THE LITERARY MONUMENTS IN PROPERTY SURVEYING 333
Professor Winfield H. Eldridge

THE ORIGINAL PLAN FOR AN AMERICAN RECTANGULAR LAND SURVEY 339
William D. Pattison

SURVEYORS TAKE GIANT STEPS WITH TWO-WAY RADIO 347
A. W. Harrison

WHEN IS A LINE? 349
Gurdon H. Wattles

ROTOVERSER 357
Kenneth Deardorf

THE WATTS MASTER COMPASS 359
D. R. Stanley

THE COUNTY ATLAS OF THE UNITED STATES 365
Norman J. W. Thrower

SURVEYING AND MAPPING LITERATURE 373

DISTINCTIVE RECENT MAPS 377

THE SURVEYOR AND THE LAW 379

BOOKS IN REVIEW 380

ABSTRACTS OF ARTICLES ON GEODESY AND RELATED FIELDS 381

MAP INFORMATION 385

COMMENT AND DISCUSSION 391

NEWS OF RELATED ORGANIZATIONS 396

CONGRESS NEWS 401

APPLICATION FOR MEMBERSHIP 410

NOTICE ON ORDERING REPRINTS 410

NEW MEMBERS 411

CONGRESS DIRECTORY 416

SUSTAINING MEMBERS 417

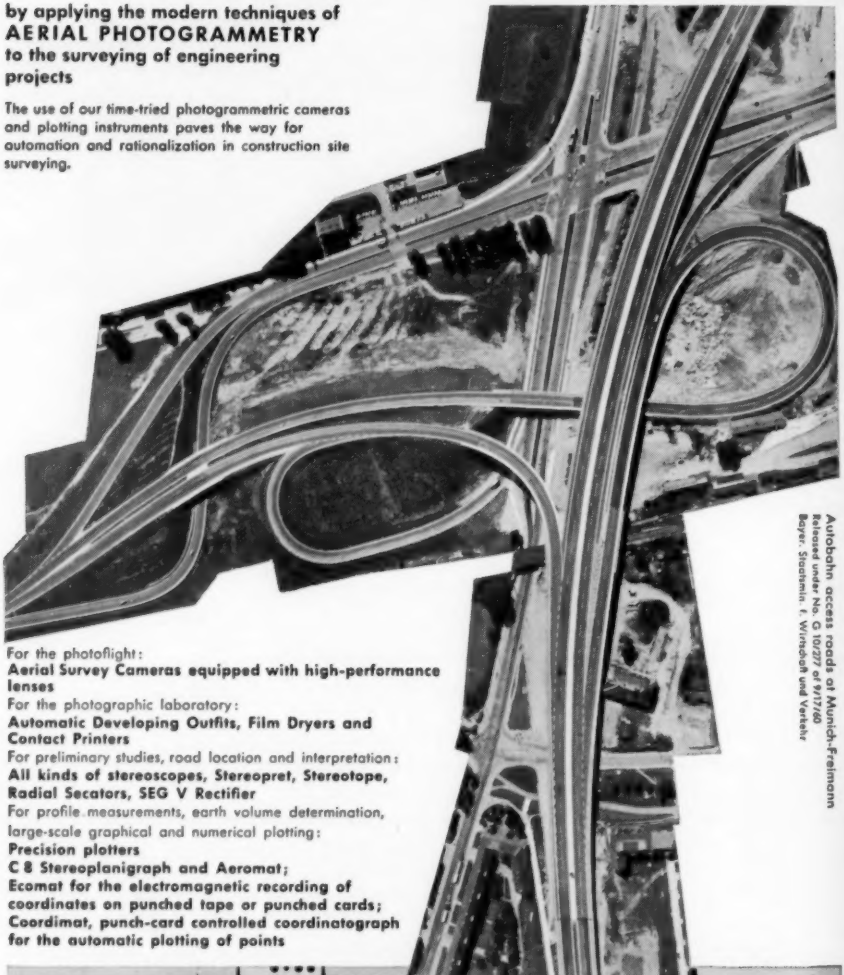
1962 ACSM & ASP CONVENTION 424

Opinions or assertions expressed in articles in this Journal do not necessarily represent the official views of the CONGRESS.

SAVE TIME AND MONEY

by applying the modern techniques of AERIAL PHOTOGRAMMETRY to the surveying of engineering projects

The use of our time-tried photogrammetric cameras and plotting instruments paves the way for automation and rationalization in construction site surveying.



Autobahn access roads at Munich-Freimann
Released under No. G 10/27 of 9/17/60
Bayer. Staatsmin. f. Wirtschaft und Verkehr

For the photoflight:
Aerial Survey Cameras equipped with high-performance lenses
For the photographic laboratory:
Automatic Developing Outfits, Film Dryers and Contact Printers
For preliminary studies, road location and interpretation:
All kinds of stereoscopes, Stereopret, Stereotope, Radial Secators, SEG V Rectifier
For profile measurements, earth volume determination, large-scale graphical and numerical plotting:
Precision plotters
C 8 Stereoplanigraph and Aeromat;
Ecomat for the electromagnetic recording of coordinates on punched tape or punched cards;
Coordimat, punch-card controlled coordinatograph for the automatic plotting of points

Write for detailed leaflets

ZEISS-AEROTOPOGRAPH MÜNCHEN
München 27, Ismaninger Straße 57

ZEISS AEROTOPO

Sole Agents for U.S.A. TRANSMARES CORPORATION, 15 William Street, New York 5, New York
929 Highgate Road, Alexandria, Va. Telephone SOuth 5-1444 P.O. Box 562

President's Message

ON COMING OF AGE

On reaching twenty-one, the American Congress on Surveying and Mapping has every right to be proud, but has every reason to look about to examine the world in which it has attained its majority. Until now we have been busy growing up, but at this milestone we can be permitted a last lingering glance at our passing youth before embracing the strenuous tasks of manhood. I join with all in being truly proud of those whose foresight brought the ACSM into being, of those who nurtured it in its infancy, of those whose devotion and zeal reared it through its adolescent years to become the imposing organization it is today.

We must be proud of them, those men whose names and deeds are known to all, and who happily are almost all still with us today. They too should be proud of what they have done, and we hail them for their achievement. Through the Congress, each of us can and does receive vital help and information and a sense of belonging; it is an instant source of professional contact, a means of consultation, and a bureau for varied and invaluable services.

THOUGHTS AT TWENTY-ONE

Twenty-one is an optimistic age, because great things lie ahead. The ACSM, with 6900 members today, can grow enormously and gain in worth; its horizons are unlimited. Within a decade I foresee the Congress spawning great activity, serving as the meeting ground of all those whose work entails surveying and mapping, and becoming the great important influence in the nation's surveying-mapping complex. Predictably the "geometre" concept—a unity of the entire spectrum of surveying, measurement, geodesy, cartography—will grow on us, and I foresee its need for us. The separate tight compartmentation of narrow specialties within the spectrum can only hinder progress: a congress truly ought to serve to break them down. Our aim must be to better education both broad and deep in the entire field, with proper research and development of the whole body of learning properly housed in the colleges and universities. Greater knowledge daily reveals the need for advanced precision, accuracy, and reliability. Our simpler narrow operations of the past will no longer suffice.

The ACSM now has its contacts overseas through the Federation Internationale des Geometres (F.I.G.) and the International Cartographic Association (I.C.A.). In Paris during May, our delegates took a leading role in the formation of the I.C.A., a truly auspicious venture for the Congress on the international scene. In Bern at the June meeting of the Permanent Committee of F.I.G., it was voted to hold the 1963 meeting of the Permanent Committee in the United States. Liaison with F.I.G. and I.C.A. has thus given us a new role of international prominence, and the ACSM cannot shirk the challenge.

PRACTICAL REFLECTIONS

Achieving twenty-one is not enough: before us now a future lies and it is ours. The problems of the practical call us to task. Our heritage is one of zealous toil for an ideal, a Congress that will bring together all with common interest in the surveying-mapping complex, that will further our mutual aims and unite us in promoting the nation's best interests. The Congress has done these things and will continue to do so. On the edge of space as we are today, thinking sober thoughts that were but wildest dreams two decades ago, we must align our perspective to see that the Congress will go on apace.

Upon assuming office in March, I recognized that I can best serve the ACSM by initiating a self-scrutiny of aims and purposes, of organizational structure, of needs, trends, and costs, of everything that touches on our growth and operations. To spearhead this objective study I called on three busy and devoted men, and their report is due to be completed by October 1st. These

three, John H. McAlinden, Victor H. Ghent, and Clifford A. Thorpe, Jr., are our Financial and Administrative Matters Committee. At the time of the Western Regional Conference in October, the Board of Direction will meet also in Phoenix and act on the Committee's report.

Out of this work we can expect a renewed and vital ACSM. Some constitutional revision is foreseen to strengthen ties with outlying areas of membership, some operations of the Central Office will be overhauled, and certainly new programs of activity will be put into effect. We can expect increased service to and liaison with our members nationwide, with consequent increase of ACSM's stature as the national spokesman for the surveying-mapping population.

Immediate needs will come to mind: a roster of members, a twenty-year index of SURVEYING AND MAPPING, the publication of various bibliographies, a Newsletter and/or more frequent issuance of the Journal. Each of these projects has been impossible to date through lack of funds for such expanded operation. Many procedures in the Central Office that must be rendered easier and more efficient, could not be changed without assurance of a strong financial base for the Congress. Anticipating the concurrence of the membership, however, we have this year begun to undertake each of these tasks by budgeting heavily in the red. In December we can expect the newest Roster, long and sorely needed; the Journal Index will be available shortly thereafter, being already in preparation; and an intensive study of our publications currently in progress will result in action by the Board at its October meeting.

THE CHALLENGE

We have great expectations as to the future of the ACSM, but these will not come about by "fiat." Wishing will not make it so. Increasing (or even maintaining) Central Office activity will cost more: we can no longer impose on those heroic volunteers who have served till now. They must have help, and we must give them help and soon stand by ourselves.

How much this is to cost is being studied now. But this much is already certain: if the ACSM is to continue, the dues must be increased. Sober reflection will indicate to all that, had we since 1940 simply kept pace with the cost of the dollar, the dues today would be more than double what they are. Where I mentioned this at Section meetings anywhere the genuine response has been fervent agreement and anticipation of an even greater future for the Congress. We presently also have under advisement a plan that contemplates two rates of dues and probably two degrees of membership. Such a plan would spare the younger men the full impact; we feel the older men can take on the greater increase.

The time is long past when we can afford to question whether we shall raise the dues. As activities and services increase, the Central Office must expand—and costs will rise. Having to cut back on good and needed projects through lack of funds is untenable.

THE PROPOSITION

The President of the Congress must speak to and for the conscience of the membership, forming that opinion which is the atmosphere conducive to wholesome dedicated service to and by the Society. More than the safely printed words of the Constitution and Bylaws, he must foster the organic constitution which is the Congress in action. To do less would be to lead too meagerly and fail his trust of leadership. I offer at this time the chance to all the membership to carry out the true development we must see in the Congress.

I urge that all who wish will write to us their views on dues, on membership, on services, on any facet of the Congress. In the shortest possible time the proposition will be placed before the membership in form of a report, and after that for ratification. I ask all to join in firming up the future of the ACSM.

The call is clear to all who will see the ACSM grow into the organization it needs to be. Let it not be said that to us from failing hands the torch was thrown—and we dropped it. Let us grab it and hold it high. At twenty-one, the future can look brighter than ever.

BROTHER B. AUSTIN BARRY
President

Mapping of Antarctica[1]

By WILLIAM A. RADLINSKI

U. S. GEOLOGICAL SURVEY[2]

ANTARCTICA is the most remote, the bleakest, and the coldest continent on the earth. The principal U. S. base, McMurdo, is over 2,000 miles from the last point of embarkation in New Zealand. The continent is virtually inaccessible during the dark winter and can only be reached during the austral summer by icebreakers or long-range ski-equipped aircraft such as the Lockheed C-130, "Hercules." Only during the relatively short "spring" and "fall" seasons can wheeled aircraft be landed, and this must be on carefully prepared bay-ice runways. Antarctica's 5½-million square miles is 9/10 covered with snow or ice; in Marie Byrd Land to the depth of as much as 3,000 meters. Ninety-five percent of all the world's ice is in the Antarctic area. A sudden melting, an unlikely possibility, could raise sea level over 200 feet and flood every major seaport in the world. There is no vegetation in Antarctica other than lichens. Mountains are as high as 5,100 meters. There are, of course, no native Antarcticans, and

[1] Presented at the 21st Annual Meeting of the American Congress on Surveying and Mapping, Washington, D. C., March 22–24, 1961.

[2] Publication authorized by the Director, U. S. Geological Survey.

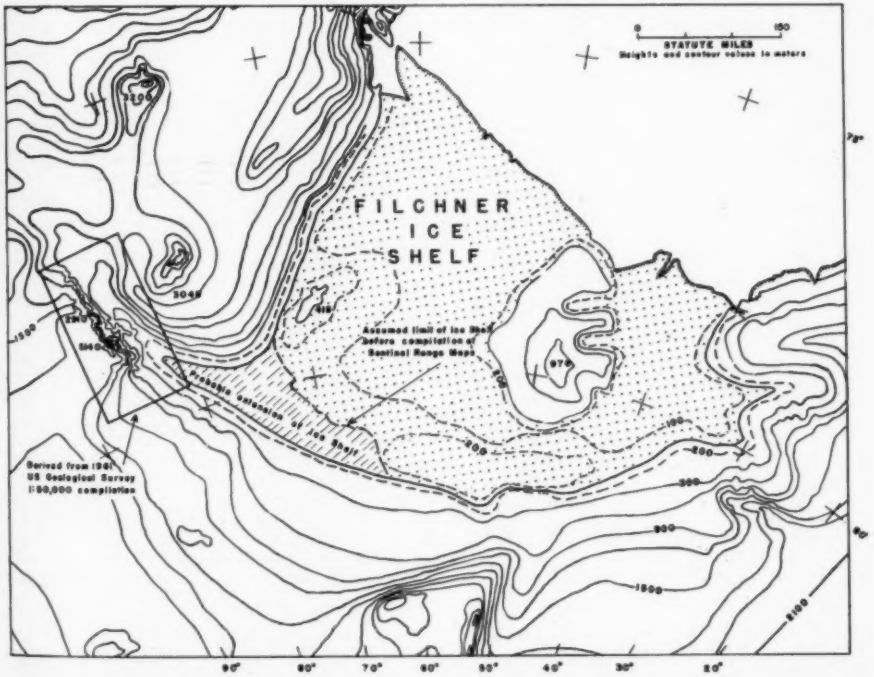


FIGURE 1.—Probable extension of Filchner Ice Shelf as determined from compilation of Sentinel Range Maps.

only wild life indigenous to the land and surrounding ice-pack area are seals and birds, including the penguins. Temperatures as low as minus 104° F. have been recorded at the Pole Station, where the average year-round temperature is minus 60 ° F. Hundred - mile - an - hour winds are not uncommon. Overland travel is dangerous and difficult not only because of the severe weather but also because of hidden crevasses and hardened, irregular snow drifts called sastrugi.

NEED FOR ANTARCTIC MAPS

In view of the inhospitality of this area one might logically wonder about the current interest in mapping it. The main reason is that maps are needed to support the vast scientific program that is underway and planned for Antarctica. The United States is investing several million dollars each year for scientific studies to explore the secrets of the Antarctic. Seismologists find the continent to be an ideal site for studying the internal structure of the earth. Biologists are studying the behavior of penguins and the ecology of marine life of the surrounding sea. Geophysicists are measuring the thickness of the ice sheet on oversnow traverses. Glaciologists are investigating the nourishment, wastage, and movement of glaciers, as well as snow content and history. The meteorological program includes several specialized studies to develop an overall climatological picture of Antarctica. Geologists are working in various areas in such fields as geomorphology, mineral investigation, and petrology to increase their knowledge of this continent which has been cold for over 100,000 years. These are some of the investigations for which topographic maps are needed. Annual mapping plans are designed to provide direct support to these programs wherever possible.

As an illustration of the significance of topographic mapping in Antarctica it has been determined from a recently completed compilation in the Sentinel Range area that, because of certain topographic configurations, the Filchner Ice Shelf may extend many miles farther inland than originally assumed, and that islands probably exist in an area that was thought to be a solid land mass. Figure 1 illustrates this finding. Not only is this finding significant topographically and geologically, but also meterologically, because the amount of ice flow (referred to by meteorologists as the "heat and moisture budget") and the wind flow from Antarctica have a major effect on the weather of the rest of the world.

PARTICIPATING U. S. AGENCIES

The U. S. Geological Survey is the agency most actively engaged in the complete production of topographic maps of Antarctica. The data developed for topographic mapping is also used by the Aeronautical Chart & Information center for the preparation of aeronautical charts, and by the U. S. Navy Hydrographic office for the compilation of the land portions of hydrographic charts. Non - Government organizations which produce Antarctic maps are the American Geographical Society and the National Geographic Society, each of which publishes small-scale maps covering the entire continent on one sheet. In addition, certain universities engaged in Antarctic research programs may prepare special-purpose maps in connection with their studies.

The National Science Foundation, through the U. S. Antarctic Research Program, has the principal coordinating management role in developing and carrying out an integrated U. S. scientific program for Antarctica, while the Department of Defense, through the U. S. Navy, has the responsibility for planning and carrying out operations in support of the scientific program. Thus in the case of the topographic mapping program, three agencies participate—the National Science Foundation as an advisor on the location and extent of areas to be mapped, and to provide funds; the Geological Survey to specify the detailed requirements and accomplish the mapping; and the U. S. Navy to insure the feasibility of field operations, provide the logistical support, and obtain the aerial photography.

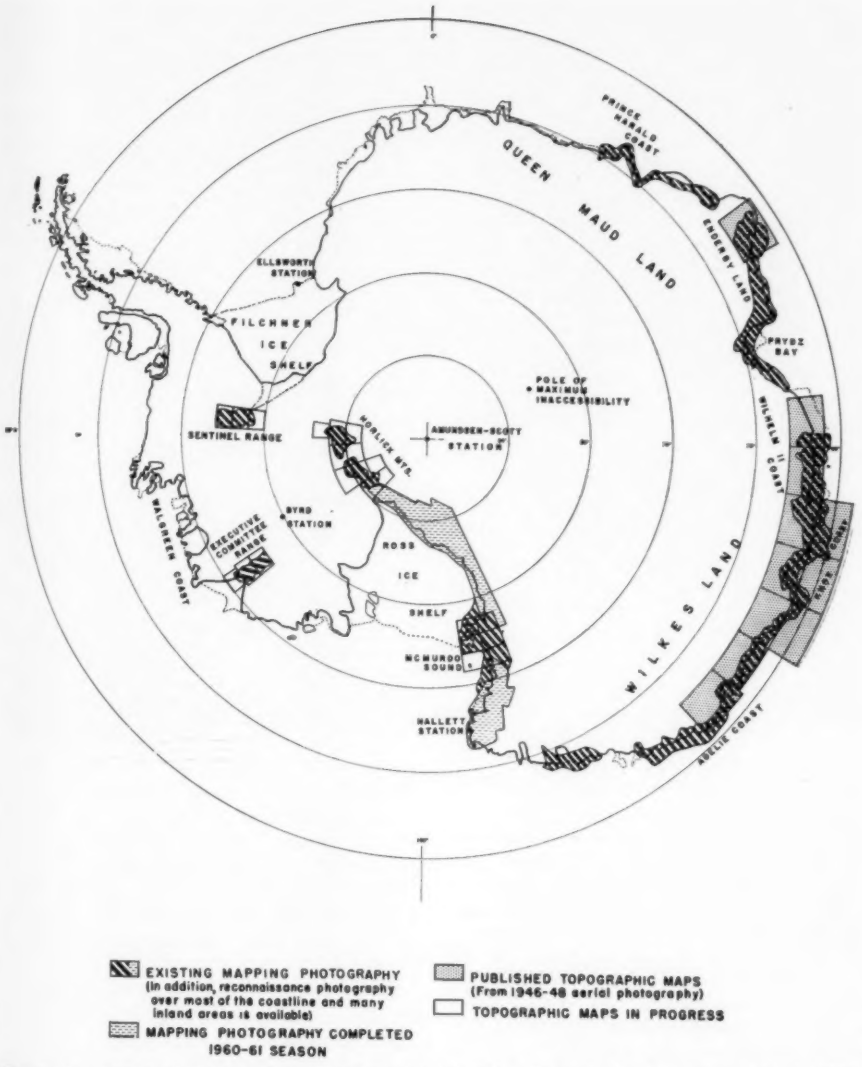


FIGURE 2.—Status of United States Topographic Mapping Program in Antarctica, March 1961.

FOREIGN COOPERATION

The nations that participated in the Antarctic program of the International Geophysical Year agreed that the scientific work should be continued, and formed an international committee known as the Special Committee for Antarctic Research (SCAR). U. S. representation on SCAR is through the Committee on Polar Research of the National Academy of Sciences. International cooperation on cartographic matters is effected by the Work Group on Cartography of SCAR, on which George D. Whitmore of the U. S. Geological

Survey is the United States member. The Work Group has set forth many technical specifications for international adoption in order to achieve standardization of Antarctic maps. More important, however, is their agreement to exchange freely all cartographic data developed by participating countries, and to avoid duplication of work where possible. Other nations active in Antarctic mapping are Great Britain on the Palmer Peninsula; Australia, Russia, Norway, Belgium, and France along the coast of East Antarctica; and New Zealand in the area west of the Ross Ice Shelf. Nations which have an Antarctic program but are less active in mapping are Argentina, Chile, Japan, and the Union of South Africa.

LONG-RANGE PLANS

Long-range plans for the United States Antarctic mapping program include the publication of 1:1,000,000-scale topographic maps, with a contour interval of 300 meters, covering all of the continent. However, inasmuch as the initial effort will be concentrated on areas where intensive scientific investigations will be conducted, many early publications will be at scales of 1:250,000 or 1:500,000 with correspondingly smaller contour intervals. All of the topographic maps will be published as shaded-relief editions. The initial phase of the program will be mainly in West Antarctica, that area from 20° west longitude westward to 160° east longitude, where the United States scientific program is presently being concentrated.

CURRENT MAP COMPILATION ACTIVITIES

The U. S. Geological Survey is currently completing the compilation of ten maps of the Horlick Mountain area, three of the Sentinel Range area, and three of the Executive Committee Range; and compilation of six maps of the McMurdo area has been started. The status of this mapping is shown in Figure 2. All of these maps will be published at a scale of 1:250,000. In addition, three maps at a scale of 1:500,000 along the Wilkes Land coast of East Antarctica have just been published. These latter maps are part of a series prepared from photography obtained during the U. S. Navy Highjump expedition in 1947. Eight maps of this set were published in 1956.

The Geological Survey is also in the process of preparing a multicolored plastic relief model of Antarctica which is expected to be completed this year. The model will be at a horizontal scale of 1:10,000,000 with an exaggerated vertical scale, and will consist of two sections. The lower section will show the submarine floor, sub-ice topography, and ice-free mountain areas. The upper and removable section will show the relief of the continental ice mass and the sea level surface. The projections of mountain masses through the ice will also be shown on the upper section. The tips of Australia, Africa, South America, and New Zealand will be included. This will be the first such model of its kind ever produced and should be of value to scientists and educators as a ready means of studying the major topographic features of Antarctica, as well as the intercontinental relationships.

AERIAL PHOTOGRAPHY

The current compilation procedure for topographic mapping is the time-proven World War II trimetrogon technique. This system offered the best solution for the economical preparation of reconnaissance-type maps with a minimum of ground control. Another contributing reason for the selection of this process was that the available aircraft for aerial photography had performance limitations which precluded the selection of a more modern photogrammetric system. All of the mapping photography is being obtained by the U. S. Navy Air Development Squadron SIX (VX-6), utilizing ski-equipped P-2V aircraft which have an operating ceiling of about 20,000 feet above sea level. Figure 3 is a photograph taken in November 1960 under this program. During the 1959–60 season, the VX-6 squadron obtained about 45,000 square miles of mapping photography. In the 1960–61 season just completed, approximately 100,000 square miles were successfully photographed.

FIGURE 3.—Trimetrogon wing photograph of Barnes Glacier. (U. S. Navy photograph for the Geological Survey.)

Figure 2 shows the general location of this coverage. Negotiations are currently underway by the Navy to obtain more modern aircraft for the photographic mission in Antarctica, but these probably cannot be made available before three years. In the meantime it is expected that the P-2V's will continue to be used, and production is expected to continue at about 100,000 square miles per season. It is planned to equip the new aircraft with cameras not only for standard optical photography, including super-wide-angle, but also for radar and infrared coverage. In addition, the plans include the use of self-contained systems for establishing supplemental horizontal control and radar elevations along the flight path.

The procurement of source data such as aerial photography is one of the most difficult phases of the Antarctic mapping program. Not only must aircraft have certain performance characteristics, but there are problems of fuel, bases, and weather. A study is currently underway to determine the exact photographic needs over the so-called "featureless" areas of the vast continental ice cap. These areas are gently rolling, snow-covered expanses whose only features are sastrugi, crevasses, and rivers of ice. Figure 4 is an example of an area covered by sastrugi and hidden crevasses. East Antarctica, for example, an area of about 4 million square miles, is primarily featureless except for a mountainous band about 200 miles wide along the coast. Similarly in West Antarctica there are several hundred thousand square miles that are devoid of rock exposures. Snow and ice features are

FIGURE 4.—Sastrugi and hidden crevasses in area near Britannia Range. (U. S. Navy photograph for the Geological Survey.)

cartographically important to scientists, particularly glaciologists and meteorologists, and it is hoped that some system, more feasible than complete coverage with standard optical photography, will provide the necessary source data over the featureless areas to satisfy their needs. It appears at present that radar photography and radar-altimeter elevations may be the solution.

GROUND-SURVEY CONTROL

Ground-survey control for topographic mapping has been obtained by U. S. Geological Survey engineers operating during the summer season in various assigned areas in Antarctica (Fig. 5). In some cases these engineers also served as navigators for traverse parties engaged in other scientific work.

Last season, the Geological Survey assigned six men to work on the ice. A similar number is planned for next year. One Survey man, William H. Chapman, wintered over at Byrd Station in 1959.

FIGURE 5.—Control-survey engineers using Tellurometer near McMurdo, Antarctica. (National Science Foundation photograph.)

The method of obtaining horizontal control is to establish astronomic fixes with Wild T-2 theodolites in accordance with a line-of-position method. This technique requires precise time measurements and each man carries a radio to receive WWV time signals, a chronometer, and a stop watch. Vertical elevations are established with altimeters using a modified leap-frog method. These procedures are described in detail in a paper presented by William H. Chapman at the June 1960 meeting of the American Society of Civil Engineers in Reno, Nevada. Copies of this paper are available from the U. S. Geological Survey. In addition, last season two engineers established a precise network of control in the McMurdo area using Tellurometers. This latter work was quite successful, with the only problems encountered being weak batteries because of the extreme cold and the inability of available helicopters to place the engineers on certain high mountain tops. Next year's plans include two several-hundred-mile-long, helicopter-supported traverses along the tops of mountain ranges paralleling the Ross Ice Shelf, using electronic distance-measuring instruments. Antarctic field engineers now travel by airplane, helicopter, or on snow vehicles known as Sno-Cats. Dog sleds are no longer used by Americans for Antarctic travel, although some of the other nations still use them.

PROGRAM APPEAL

There is a great deal of excitement in Antarctic mapping which accounts for the appeal that it has for those few engaged in it. Mountains are located that were not known to exist; flat areas are found where mountains were supposed to have been; previously accepted elevations are determined to be in error by hundreds of feet; and ice shelves are found to extend far beyond previously accepted limits. These findings add something new to man's knowledge of the earth by unveiling the mysteries of unexplored areas. The full value of this work is yet to be determined. We are still in the pioneering stages of Antarctic mapping, comparable timewise to that era in the late 1800's when John Wesley Powell and Clarence King explored and surveyed the West. Let us hope this work will be as fruitful as theirs.

Canadian Land-Use Maps

The publication of the first three sheets of a series of Land-Use Maps being prepared by the Geographical Branch of the Department of Mines and Technical Surveys has been announced. These sheets, printed in color and with bilingual explanations, are available at 25 cents each from the Director, Geographical Branch, Department of Mines and Technical Surveys, Ottawa, Canada. The three sheets so far published are the Truro, Halifax, and Shelburne sheets, which cover areas in central and southern Nova Scotia. They show in detail the effects of human settlement on the land—the distribution of industrial, commercial, and residential construction; crops, such as hay, grain, blueberries; orchards; woodland, scrub, and cut-over areas; and swamps and marshes.

Tenth Congress of F. I. G. and Surveyors' "Traverse" of Europe

The Tenth Congress of F.I.G. (the International Federation of Surveyors) will be held in Vienna—August 29 to September 6, 1962. This will include several days of technical meetings, extensive tours of the city and vicinity, and several social events.

While some technical talks will be in French or German, with only summaries in English, all discussion will be fully translated. With a little patience, American surveyors should find the meetings of the seven technical commissions interesting and profitable. Most valuable, perhaps, is to make personal contact with men in our field from countries where the professional status of surveying is unquestioned, and where formal surveying education is much more extensive than in the United States. Furthermore, sightseeing and visiting technical facilities in the company of local friends from our own profession is a far different experience than going to the same places as a tourist. Those who attended the Ninth Congress in Holland in 1958 found it a most rewarding experience.

In order that American surveyors may get the most out of trip to Europe for the F.I.G. meetings, a group tour to and from Vienna is proposed. To differentiate from the standard sightseeing tour we are calling it a "SURVEYORS' TRAVERSE," with one-day visits to mapping agencies, surveying installations, or educational institutions being planned at each stop in addition to sightseeing and recreational activities. On days when technical activities occur, special plans will be made for the ladies. A tentative schedule is: London, August 17–19; Brussels, August 20–21; Holland, August 22–23; Berlin, August 24–25; Warsaw, August 26–27; Vienna, August 28 to September 6; Switzerland, September 7–9; Northern Italy, September 10–11; and Paris, September 12–13. Travel to London, and return from Paris homewards, will be independent.

Before any specific arrangements can be made, it is necessary to know how many are interested. It will also be helpful to know whether the above schedule is generally satisfactory or whether enough persons prefer longer or shorter tours to arrange additional itineraries. Comments on costs will be helpful: Do most surveyors wish to travel (1) deluxe, (2) comfortably, or (3) with economy the major factor.

Costs for the above tour will be somewhat dependent on the number going. If a considerable group can agree on a single itinerary, many special arrangements are possible. Living costs are also hard to estimate, since one can (at deluxe hotels and cafes) spend as much as in the United States, or one can go to the opposite extreme and get a good meal for the price of an American sandwich. Entirely satisfactory rooms (with bath) are available at $6 to $9 single, and $12 double—without bath one can slash this materially. On the average, meals run about two thirds of U.S. prices. For estimating purposes, the following figures may be useful:

Round-trip economy fare, New York-Vienna, via proposed route	$675.00
Registration, excursions, banquets, and activities during Vienna meetings	60.00
Sightseeing at the eight stops on the above tour	96.00
Room (with breakfast)—28 days at $8.00	224.00
Meals—28 days at $5.00	140.00
Miscellaneous (including tips, taxis, etc., but excluding gifts, film, theater, etc.	100.00
	$1,295.00

If interested please write *at once* to Chairman George C. Bestor, F.I.G. Committee, ACSM, P. O. Box 3045, Carmel, California. We do not need commitments now, just some idea of how many are interested and their general desires. With these data at hand, arrangements can be made with a travel agency to set up a specific program or programs and make these available early in 1962. With better knowledge of the desires of interested members, it will be possible to work out a tour plan which will be both educational and entertaining, as well as a memorable experience for those interested in Europe and the Vienna meetings.

The Literary Monuments in Property Surveying

By PROFESSOR WINFIELD H. ELDRIDGE[1]

UNIVERSITY OF ILLINOIS

ONE of the original government township plats for Sangamon County, Illinois, bears a certificate of the deputy surveyor and is signed only with an "X." Here was an unfortunate man indeed as he could not benefit from the considerable amount of literature that had already been written about surveys, by surveyors, and that pertained to the great American adventure of which he was a part.

The very progress of our civilization, especially that recorded for the succeeding generations, has been dependent upon man's communication to man. Recorded information provides us with the necessary starting point to push further into the unknown. Every surveyor knows that a proper backsight is essential before a foresight can be established. Education is developed from facts, reasoning, and understanding, and these are best acquired from the libraries of recorded knowledge.

The early surveyors (except for the poor unfortunate Mr. X) availed themselves of the books of the day. There were very few textbooks produced in America at the time of the Revolutionary War and before, but such books as Love's *Geodesia* and Crocker's *Elements of Land Surveying,* after finding their way across the ocean from England, were of great help to the practical surveyor. Many early surveyors relied on geometry and trigonometry texts and followed custom in the technical procedures.

The development of the U. S. Rectangular System, beginning with the survey of the Seven Ranges, touched off a series of books, manuals, pamphlets, and articles on "How To Survey," "Pioneer Living," and "Steps for Land Acquisition." Several great surveying textbooks were written early in the nineteenth century in America. Such books as Gibson's *Surveying,* 1821, Gummere's *Surveying,* 1820, and Gillespie's *Surveying,* 1851, contributed greatly to the storehouse of knowledge and can be found today in many libraries.

A few books were written especially for land surveyors and nearly all of the surveying textbooks included a comprehensive treatment of the fundamentals of the U. S. Rectangular System and the procedures necessary in laying out divisions of land. One book, *Public Land Surveys,* published by the American Book Co., 1844, was written for high school students and stated in the preface: "Every boy should know how to read the descriptions in a deed and to locate the property called for by the instrument."

Few books especially written for the property surveyor have appeared in recent years and only two are in print today. Valuable information, however, is found in articles, bulletins, addresses, and conference proceedings. The basic surveying textbooks of a century ago usually contained large portions on the surveys of the public lands, property surveying, and subdivisional surveys. This content gradually decreased until a few years ago, only one chapter was devoted to the whole subject. One of the most recent books on surveying to be published, Smirnoff's *Measurements for Engineering and other Surveys,* Prentice-Hall, 1961, has only two short appendices totaling eight pages on the subjects of the public land surveys and property surveying.

Presented at the 21st Annual Meeting of the American Congress on Surveying and Mapping, Washington, D. C., March 22–24, 1961.

[1] Professor Eldridge is Chairman of the Publications Committee of the Property Surveys Division, which for the past two years has been actively engaged in compiling a bibliography on property surveys. Much of the material for this paper was obtained, more or less as a by-product, during the search for bibliographical material.

At best, it is no easy task for the curious property surveyor to probe into the mysteries of his profession, and it is apparent that he will no longer get much help from the college textbooks on surveying.

THE VALUE OF LITERATURE

Property surveying is not an exact science and cannot be performed by a set program or routine procedure. The surveyor, in this case, must exercise considerable judgment that has been developed with mature reasoning. The brain must have proper stimulus to grow to such tasks, and the ideas that are provoked by written experiences and theses provide this food for thought. Even a theory that is completely wrong or poorly expressed will serve to enlighten the mind of the serious student.

Inspiration has been the salvation of our profession. Even though the boundaries we retrace are ancient and our jurisprudence medieval, only modern thinking can advance our technology to a point where we can serve society in the way that our present-day economy demands.

The property surveyor is a highly specialized man but still he *must* understand many more things surrounding his profession than his ancestors were required to understand. With the legal aspects on the one hand, and the complexities of engineering technology on the other, the surveyor's mind must be open, curious, and encouraged to grow continually.

Knowledge can be acquired from experience, deduction, and study. Certainly the most effective and efficient of these is study, and, as our libraries grow, our opportunities for study increase geometrically.

EARLY RECORDS

Where do we find written references pertinent to property surveys? Perhaps these would be as old as transfer of title itself. Earliest recorded history accounts some of the problems of land ownership and boundary marking. It is from these ancient works that we have decided that surveying is the "second oldest profession." The problems of boundary markers, sovereignty, and land tenure as explained in the old testament would not appear out of place in today's newspaper. In the books of Deuteronomy, Job, and Proverbs there is the admonition not to remove the landmarks! The Epics of Homer recount some of the disputes of the day over the ownership of land. The activities of surveyors are described in the stories of Ulysses, Anthony, and Caesar, and the basis of our property law is found in Frontinus' *De Agrorum Qualitiate*.

Some of the early English books were the standbys of the Colonial surveyors. One of the contributors to this valuable literature was Edmund Gunther (1581–1626), who wrote on the surveyor's chain, magnetic variation, and a quadrant for star observations, and introduced the terms *cosine* and *cotangent*.

THE SCOPE OF LITERARY RESOURCES

Information for surveyors is found in many different forms. In the bibliography now under preparation by the Publications Committee of the Property Surveys Division, references are found in books, articles, bulletins, manuals, addresses, films, and other miscellaneous works. Nearly 200 books, ranging from instructions in surveying the public domain to the history of land reform, have been listed. Most of the references are articles found in periodicals, with 200 of these from the journal SURVEYING AND MAPPING. This source alone, if published in book form, would contain about 1,800 pages, or more than three full-size volumes! Some of the great sources of information are the many papers and addresses given at conferences and seminars such as this one we are now attending. About fifteen States have annual conferences or short courses for land surveyors and from these proceedings comes a considerable amount of worthwhile information.

Many of the items to be listed in the bibliography deal with surveying practice, and include the elements of geometrical surveying, problems with the location of random lines, application of triangulation, etc. Much of this is found in the more popular textbooks, though many of the new ideas have come from shorter articles

in SURVEYING AND MAPPING. In the early days, it was necessary for the surveyor to learn basic mathematics from books, probably by the light of a campfire. Shobal V. Clevenger, in *A Treatise on the Method of Government Surveying,* published by D. Van Nostrand Co., 1874, states on page 11:

> While it is possible for the deputy to perform his work without much knowledge of trigonometry, it must occasion him embarrassments, and cause him to resort to absurd and even erroneous expedients, the results of which manifest themselves unexpectedly, in augmented forms probably many miles from their origin, creating the alternative of what is called shrinking, fudging, returning false notes, or laboriously correcting and destroying the work of days, and in some cases, weeks.

Surveying technology has progressed at a very rapid rate ever since the invention of the solar compass in the middle nineteenth century. Today, the rate is faster than ever, and if it were not for the articles and papers, considerable time would be needed for the men in practice to learn of new instruments and techniques.

Because of the pioneer nature of their practice, surveyors have benefited from the many helpful hints on work in primitive areas. In W. A. Burt's book, *Key to the Solar Compass,* published in 1855, there is an elaborate account of how flour is mixed for bread on a piece of cotton drill when the surveyor is at camp. In Clevenger's book, previously mentioned, we learn what is required in the surveyor's pack:

> Implements, etc.—Compasses, chains, pins, marking irons, hammers and stone chisels, flat and round files, whetstones, spades, axes, handaxes, wrench, guns and ammunition, fishing tackle, small cooking camp stove, dish pans, tin pails, tin basins, quarts (in lieu of plates), butcher knives, spoons, fry-pans, kettles, awls, thread, twine, coffee mills, baking ovens with lids, wall and common tents, blankets, buffalo robes, ponchos, boots or shoes with scotched or broad soles, and other suitable apparel including white woolen hats with broad brims, silk neckerchiefs of some light color, not red, field glasses, kegs for water, guy ropes for tents, books of instruction, tables, tablets, field notes and writing implements.

In *A Surveyors Guide,* by B. F. Dorr, there are instructions on how the pockets should be sewed to prevent small objects from falling out when the surveyor stops to drink from a spring.

The property surveyor, more than his engineering brother, must keep abreast of the law. Many of the early books on land surveying have abstracted the laws and recited many court decisions. Hodgmen, Skelton, and Clark have each produced monumental works that present the legal aspects of property surveying. Many lawyers have written works on property law, and the essay by Justice Thomas M. Cooley is a classic on the judicial functions of the land surveyor.

The original acts and ordinances are found in many places today and I am sure that if they had been as available to the surveyors a hundred years ago, there would be less confusion in retracting the ancient surveys today. Such authors as the late John S. Dodds and the late Lowell Stewart contributed greatly to the understanding of the early ordinances and the government instructions that were used in laying out the U. S. Rectangular System.

The surveyor must keep informed of the technological advances in the related fields. The 41,000 miles of new interstate highways present many new and challenging problems as well as more than 82,000 miles of new property lines. To be informed on these new advances, the surveyor must read whatever literature he can find on the subject. The space age will create problems that we have not dreamed of, I'm sure. Some will be truly "out of this world!"

Historically and traditionally, the property surveyor has been the one to plan, design, and lay out the new additions to our cities. This task today is very complex and difficult and one that requires vast resourcefulness. Fortunately, many leaders in this field of planning have given our generation and those to follow great benefit by recording their ideas in books, articles, and addresses.

The problem of assuring, insuring, and guaranteeing title is becoming common to most areas of the United States. Many energetic men with the title companies have

expressed themselves quite well as to what will aid the professions and the property owners. One example of this is the most excellent manual, *Land Survey Descriptions*, by William Wattles, who is a surveyor and a title officer. In Copp's *American Settlers Guide*, 1882, an advertisement for Illinois lands by the Illinois Central Railroad states "The Title to these Lands is Perfect."

THE PUBLICATIONS COMMITTEE OF THE PROPERTY SURVEYS DIVISION

The publications committee was formed almost two years ago by A. Phillips Bill, who was at that time Chairman of the Property Surveys Division. The task assigned to this committee was to encourage writing (for publication) on property surveying topics and to help edit material for the journal SURVEYING AND MAPPING. Soon after this committee was formed, it was suggested that a comprehensive and expansible bibliography of property surveying material be compiled. This activity has proved to be a very interesting and rewarding one.

The first step was to enlist the bibliographies that had already been prepared. Professor Kenneth S. Curtis had compiled and published one with over 200 entries in the *Engineering Bulletin*, Series No. 93, Purdue University, in 1958. Other fine bibliographies were obtained from Professor Paul P. Rice and Curtis M. Brown. These were aggregated with a rather disorganized list kept by the chairman of the committee.

The bibliography, though not finished, is well under way at the present time. Its organization was the result of several types of activities. First of all, it was necessary to search for possible entries. With the motto "leave no stone unturned," we have been looking everywhere in public and private libraries, through periodicals, journals, proceedings, etc., for books, articles, and anything from which property surveyors might benefit. Many books and articles have references and even bibliographies of their own; all of these are being systematically checked out. It is interesting to note that articles have been found on property surveying in such magazines as *Saturday Evening Post* and *Leica Photography*. Textbooks and society journals of allied professions such as forestry, architecture, and real estate have contained some interesting material.

One of the most time-consuming chores was the reading, or at least scanning, of these articles so that the work could be classified and annotated. Some of this was done on a part-time basis by civil engineering students at the University of Illinois. One fine young man was quite interested in the project and was employed to do some of the reading for so much an hour. After a couple of weeks, he was asked to report his time. He refused to do so although he had obviously spent several hours poring over many articles. "I got so interested, I couldn't stop, and it wouldn't be right to be paid for it," he explained. Then there is the story of the absent-minded professor who, while going through the library, found a volume titled "How to Hug." He thought this would prove an interesting social science study, and checked it out to take home. That evening his wife asked him why he had brought home Volume 12 of the encylopedia.

All references were classified according to the subject matter and under several different groups if appropriate. They were also identified by a code which indicated whether the reference was a book, article, paper, manual, etc. Another symbol indicated the availability, but this was based on speculation in most cases. It was found that few of the articles could be properly classified from their titles alone.

It is desired that all references carry an annotation of either a sentence or a short paragraph to give some hint as to what can be found in the work. It has been difficult to be impartial and unqualifying in these annotations, as some of the works are quite impressive.

To assemble this material into a bibliography, a card system is being used. As soon as a title is found, it is typed on a card with the names of author and publisher, and any other information that can be recorded at the time. When a classifica-

tion is determined, duplicate cards are prepared, one for each separate topic classification, and these are filed according to the subject. As the number of cards grows, subclassifications are developed. For example, the "Surveying History" list now has over 125 cards, and it has to be subdivided into many different headings according to area, age, locale, etc. This duplicate card system results in two files. One has all the titles alphabetically listed with their authors, and it serves as a master file to check against each time a new title is located. The other contains the cards according to the subjects, with many duplications of course. In all there are over 800 different references in the master file, with most of these annotated and classified.

A constant job of editing is carried on directly with the cards. Since there are many different people working on the cards, there must be some effort to have a uniform style.

The project is not finished, but it is felt that it is more than half completed. Actually, it will never be entirely completed; but if it is kept up at the present rate, it should be "caught up" by early next fall. We must realize that quite a bit of new material is being written each year. There are several excellent papers being given at this very meeting that must be included. Once the bibliography is brought up to date, it should be a simple matter to keep it current.

THE INFORMATION THAT HAS BEEN INCLUDED

Five general classifications are used to cover the entire field of interest to the property surveyor. These were grouped as; (A) Professional, (B) Legal, (C) Practice, (D) Technical, and (E) General.

The *professional* grouping includes such things as education, ethics, fees, professional standing, registration, and standards. In this classification can be found many articles that are vital to the intrinsic and extrinsic problems of the profession. Of particular interest to the committee chairman are the 25 or more references to articles on education.

The *legal* classification is a large one and embraces many topics, from common law principles to title transfers. It is here that the researcher would find references on riparian boundaries, legal description writing, right-of-way problems, and similar subjects. Certainly, a listing of all the legal references would be too vast to be handled, so only those that are of general interest have been included. For more detailed information, consult your local attorney.

Under *Practice*, one would find references to the articles on proportioning, recordation, retracements, subdivisions, U. S. Rectangular System, etc. The field of subdivision planning has been intentionally avoided because of the several excellent bibliographies already prepared on that subject, and only these bibliographies are listed.

Practical suggestions are found in many places. A. C. Mulford, in *Boundaries and Landmarks,* has this to say about marked trees: "Scars looking very much like blaze marks may be formed on trees from natural causes, while it must be remembered that a small boy with a hatchet can mark up more trees in one Saturday afternoon than a dozen surveyors can in a year." On rerunning old highway lines from the records, he has this to say: "The original record, while an invaluable general guide, is only approximately accurate."

Technical elements include such things as coordinates and control, instrumentation and techniques, mathematics and computations, mineral surveys, monuments, and photogrammetry. Only the technical topics that bear on or have relation to property surveys have been included here. It is assumed that all practicing surveyors have access to a good basic text on surveying.

The *general* classification is a catch-all, covering those items that have very broad coverage, those with fundamental coverage, those on historical background, and the miscellaneous. Actually, all the groups have listed items that are general for that particular group. Some references involve so many different subheadings that a *general* listing was necessary.

Before publication, each classification and subclassification will be further subdivided

so that the bibliography can be referred to with a special subject, and location will be easy.

THE SERVICE TO OUR PROFESSION

The first step in any research is to probe the literature for the information already recorded for posterity. No doubt, all surveying teachers welcome a bibliography that will guide them in assembling material for classes, short courses, and seminars. The students, in and out of college, have more confidence and encouragement when the way to more information is pointed out to them. The practitioners will welcome a comprehensive listing of property surveying references. Recently, a property surveyor was called to testify in court during a drainage lawsuit. He was anxious to learn as much as possible about riparian rights and boundaries. What reference material is available to him? The lay public can gain a great deal from the storehouse of literature whenever their activities coincide with property surveying problems. Title officers, foresters, real estate men, and others all have considerable need for such reference materials.

In order for a bibliography of this nature to become beneficial to the most people, it must be distributed, and some form of publication is necessary. It has been suggested that the Property Surveying Bibliography be published in bulletin form similar to the excellent *City Planning, a Basic Bibliography,* by George Bestor and Holway Jones. Such a volume, arranged according to classification, complete with notations, code, and index, would fill about 200 pages and be a handy addition to the surveyor's library. As new items become public each year, supplements could be issued. For the researcher, teacher, and student, the card deck form is quite desirable and would permit easy expansion.

It might be suggested here that the Property Surveys Division of the American Congress of Surveying and Mapping maintain a library and bibliography service for the entire membership. With a central repository for as many of the reference works as can be obtained, and a complete card system, a librarian can answer requests for information on specific subjects. Several such requests have already reached the Publications Committee. Authors preparing articles, and editors examining them for publication, would enjoy much benefit from such a service.

The bibliography can serve the profession in technical and professional improvement. It will tend to remove much of the ignorance that hinders intelligent growth and give help to our younger men seeking State registration.

CONCLUSION

As many new articles and even books are written, each year we come further and further out of the darkness. We will attain true professional standing only by proving to society that we can accept the responsibilities. Self-study is the way to growth and much literature is available to us.

On page 88 of A. C. Mulford's book, *Boundaries and Landmarks,* the author has this to say about the responsibilities of the surveyor:

> The vocation of the Civil Engineer has always been invested with a dignity of its own. But it seems to me that of late years, in paying him the honor which is his just due, we are apt to fix a little too wide a gap between him and his humbler brother, the Surveyor. We give engineering the chief attention in our technical schools, but surveying we are wont to relegate to the Freshmen class. Yet the profession of the Surveyor deals with one of the oldest and most fundamental facts of human society—the possession and inheritance of land. Fire, flood and earthquake wipe out the greatest works of the engineer, but the land continueth forever.

Frustration accompanies all endeavor, I believe, and after nearly two years with this bibliography, I only wish I had time to read!

The Original Plan for an American Rectangular Land Survey

By WILLIAM D. PATTISON

DEPARTMENT OF GEOGRAPHY, UNIVERSITY OF CALIFORNIA, LOS ANGELES

ATTENTION has often been drawn to the American rectangular land survey system, whose straight lines ideally directed toward the cardinal points of the compass, extend over vast areas of the United States. These lines, laid down by Federal surveyors, represent a strikingly simple and effective design for the division of land prior to transfer from public ownership. They enclose the "townships" six miles square and "sections" one mile square with which practically all readers of this journal are familiar. It is well known not only that this general scheme was first offically authorized in a land ordinance passed by the Continental Congress in 1785 but also that a proposed law of a year earlier, though unacceptable to Congress, laid the foundation for the land law finally approved. Reference to this earlier law may be found in many sources, but the full significance of the land survey proposed therein has remained unexplored. The purpose of this paper is to explain and interpret this original plan of survey.[1]

Entitled "An Ordinance Establishing a Land Office for the United States," the proposed legislation of 1874, in the handwriting of Thomas Jefferson, was submitted to Congress by a committee under Jefferson's chairmanship. Most of this rather lengthy document pertained to procedures for conveyance and registry of land, but the lead paragraph set forth specifications for land lines, as follows:

> It [the western country] shall be divided into Hundreds of ten geographical miles square, each mile containing 6086 feet and four tenths of a foot, by lines to be run and marked due North and South, and others crossing these at right angles, the first of which lines, each way, shall be at ten miles distance from one of the corners of the state within which they shall be . . . These Hundreds shall be divided into lots one mile square each, or 850 acres and four tenths of an acre, by lines running in like manner due North and South, and others crossing these at right angles.[2]

Jefferson's ideas are strongly represented here, as will be shown, but in justice a statement made by Hugh Williamson, a member of Jefferson's committee, must be recognized. In the summer of 1784, Williamson wrote from his home in North Carolina a few lines of praise for the land ordinance, concluding with these words: "The general object is to oblige the Surveyore to account for the land by parallels . . . and meridians . . . As I happen to have suggested the plan to the Committee it is more than probable that I may have parental prejudices in its favor."[3] As a former professor of mathematics and a practical astronomical observer, Williamson could appreciate the significance of this plan of survey. In a long career as a public servant, physician, local historian, and occasional contributor of papers on scientific subjects, Williamson gained a reputation for studiousness and integrity. Many years after the period of service of both men in Congress, Jefferson said of Williamson, "We served together in congress, at Annapolis, during the winter of 1783 and 4; there I found him a very useful member, of an acute mind, attentive to business, and of a high degree of erudition."[4] Unless evidence to the contrary may be found, Williamson's claim should be credited, in the opinion of the present author. Accordingly, the paragraph quoted above from the proposed land ordinance is referred to in the following pages as the Jefferson-Williamson plan. The contents of the plan are discussed below, under five heads.

INDISCRIMINATE LOCATION CONTROLLED

It is easy to assume that the Jefferson-Williamson plan, with its strict regularity of land lines, comprised a total rejection of the well known methods of land selection and survey practiced from Pennsylvania southward, called indiscriminate location. Under this system warrants (certificates of authorization) for specified acreages were issued to persons seeking land, the recipient of a warrant taking up his approved amount of land in a form and location of his own choosing. Resulting boundaries, as they interconnected over large areas, were typically bewildering in their irregularity.

Interestingly, the proposed ordinance of 1784 definitely prescribed indiscriminate locations for the national domain. Lands were to be claimed on the authority of warrants, and any warrant holder was to be free to choose the location of his claim, moving far in advance of the frontier settlement, if he wished, and making his claim official before it was laid out simply by satisfactorily identifying the land of his choice to the Federal district surveyor concerned. But final grants of title were to be made only for property in the shapes and sizes permitted by a uniform grid—a drastic restriction of the pioneer's customary freedom to surround with his boundaries only preferred land.

The law aimed at control of Southern land practices, then, not their abolition. Both Jefferson and Williamson had had experience with abuses under the Southern system, for example, the enclosure of excess acreage and deliberate extension of boundaries into prior claims, both of which dishonesties the new law would have curbed. Said Williamson in a letter already quoted, "I think the plan will prevent innumerable frauds and enable us to save millions."

Further, if we may trust an interpretation based upon a statement made by Jefferson in a separate connection, this manner of subdivision had a social aspect. In a report of 1790 on weights, measures, and coinage, Jefferson made a highly suggestive statement on measures of capacity (quarts, gallons, etc.), recommending box-like containers with plane walls meeting at right angles, in preference to cylindrical vessels. In justifying this preference he wrote:

> Cylindrical measures have the advantage of superior strength: but square ones have the greater advantage of enabling everyone, who has a rule in his pocket, to verify their contents by measuring them.[5]

Similarly, rectilinear land boundaries put it in the power of any settler, employing the most rudimentary means of measurement, to verify the contents of his purchase. We find implicit here a principle of Jeffersonian democracy.

The fact deserves emphasis that our familiar American land survey squares were first put forward for enactment into national law without New England attributes. Not until the reworking, in 1785, of the Jefferson-Williamson plan into a form acceptable to the Congress were the following New England practices adopted: official survey of land lines without any recognition of prior private claims; regular, compact advancement of the surveying frontier; and sale of land after survey at public auction.

DIVISION INTO HUNDREDS

"It [the western country] shall be divided into Hundreds," Jefferson's committee ordered. The hundred, a subordinate division of the shire or county in England, had at one time been an area of land assessed at a value of one hundred standard peasant holdings. It was adopted as an administrative unit in America only in the colonies of Delaware, Maryland, and Virginia. In the last-named State the hundred was not a widely recognized division in the 1780's, whereas the parish and the county, more or less equivalent to one another in scope, flourished.

The attempt to write the hundred into national land legislation was plainly the work of Jefferson, who cherished the lifelong ambition of dividing the counties of Virginia into hundreds. After his retirement from public life, he wrote to the Governor of Viriginia, "I have indeed two great measures at heart, . . . 1. That of general education, to enable every man to judge for himself what will secure or endanger

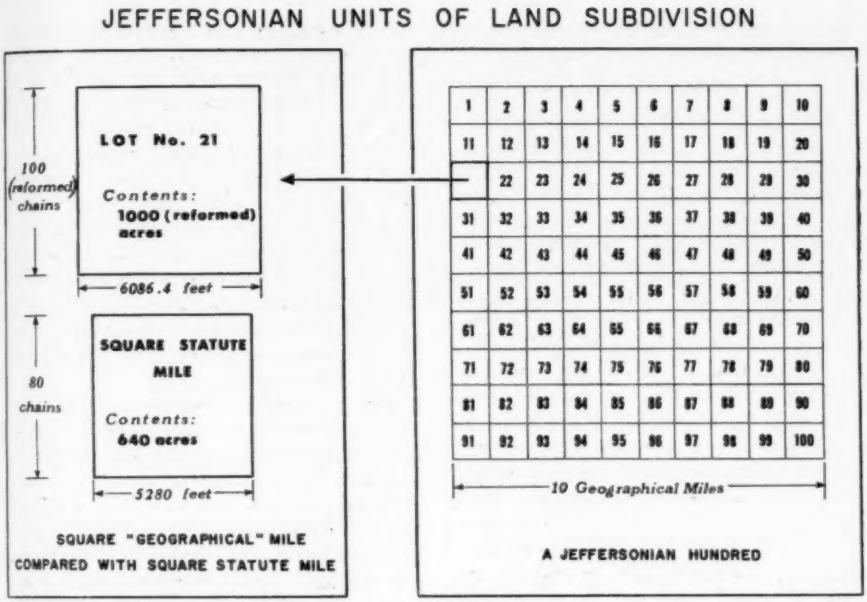


FIGURE 1.

his freedom. 2. To divide every county into hundreds. . . ."[6] In 1778, Jefferson drew up his celebrated "Bill for the More General Diffusion of Knowledge," which would have accomplished both of these aims. The bill was not passed. Twice he wrote the hundred into Virginia acts pertaining to land titles. In one of these acts as finally passed the attempt to require the creation of new hundreds was defeated by amendment, and in the other the term "hundred" was struck out. On each of these occasions, Jefferson was trying to establish the hundred, an area "of such size that every citizen can attend, when called on, and act in person," with a view to eventual concentration of a full array of local governmental functions in the unit.

In the national ordinance Jefferson restored quantitative significance to the hundred by assigning to it an area of one hundred square miles (Figure 1). In doing so he was attempting to induce general acceptance of the decimal principle into American life. Jefferson's advocacy of decimal arithmetic led almost simultaneously to proposals for similar division of American coinage and American lands. The parallelism, which has been pointed out by two earlier writers on the national land system,[7] must have been obvious to members of the Continental Congress. The hundreds, with their division into one hundred equal parts (square-mile lots, numbered as shown in Figure 1) were introduced to Congress in May 1784 and made their appearance in the printed journals of the Congress later that spring. The dollar, divided into tenths and hundredths, was put forward by Jefferson in a privately circulated set of notes on coinage which were known to some members of Congress as early as April 1784 and appeared before Congress at large in printed form in May 1785. Jefferson's scheme for coinage was adopted by Congress in 1786.

The hundred, in conclusion, represented an attempt both to stimulate the establishment of an institution of local government and to introduce decimal division into the apportionment of land. Beyond this, Jefferson intended to alter the entire system of English linear measurement. Essential to

his plan was the geographical mile, next in order of discussion.

THE GEOGRAPHICAL MILE

The geographical mile, equivalent in eighteenth century nomenclature to the nautical mile, and sometimes called the geometrical mile by Jefferson, has been passed over in earlier studies as an unrelated attempt at innovation. Yet Jefferson, in a letter written a few days after the proposed land ordinance had issued from committee, confided that it "would lay the foundation of a very dangerous proposition," that is, the introduction of a new series of decimally graduated values for old units of linear measure. He intended to "subdivide this geometrical mile into furlongs, each of these into 10 chains, [and] each of these into 10 paces, differing very little from the British furlong, chain, and fathom."[8] The length of this mile, "6086 feet and four tenths of a foot," Jefferson obtained by taking a currently accepted value for the length of a degree of latitude and dividing by sixty.

The U.S. public lands under this reform would have been measured with a surveyor's chain somewhat shorter than the traditional English (Gunter's) chain of 66 feet, as can easily be calculated from the foregoing statements. In a highly convenient progression, there would have been 100 links to the chain (as there already were), 100 chains to the mile, 10 square chains to the acre (as there already were) and 1000 acres to the square mile (Figure 1). If the geographical mile could be written into law, Jefferson said in the letter quoted above, he thought that the entire decimal progression of measure "could not possibly fail of forcing its way on the people." But regarding the geographical mile's chances in Congress he added, "I doubt whether it can be carried through."

THE PROBLEM OF CONVERGING MERIDIANS

Inherent in the Jefferson-Williamson plan was a conflict between rectangularity and cardinal orientation. The hundreds were to be of equal width (ten geographical miles) along their northern and southern boundaries, yet they were to be bounded on the east and west by meridians, which by definition are not parallel to one another and hence cannot satisfy the condition of constant width. One might say that this conflict of requirements, repeated in the Land Ordinance of 1785, is notorious; certainly it is widely known, and commonly it is regarded as a legislative "slip" whose consequences were not appreciated until surveying had been under way for several years. The fact is, however, that Jefferson, Williamson and some at least of the congressional delegates who revised their plan in 1785, were fully aware of the convergence of meridians and its results.

Almost completely forgotten today is the means whereby converging meridians would have been accommodated under the Jefferson-Williamson plan. That there was a solution then at hand may best be appreciated through description at this point of a procedure developed in later years to cope with the problem. This procedure, which characterizes modern Federal public land surveying, begins with the laying down of a "principal meridian" and a "base line", crossing at right angles to one another. One a meridian of longitude and the other a parallel of latitude, these two master lines serve to guide the construction of square subdivisions built outward from them into four independent quadrants. These subdivisions—townships, rather than the hundreds of the Jefferson-Williamson plan—are permitted to have meridians for boundaries on their eastern and western sides, which increasingly violate the rule of constant width as they are prolonged. As a remedy, new parallels of latitude (called "standard parallels") are run out at intervals of twenty-four miles, and new, correctly spaced township lines are based upon them.

In 1784, any proposed Federal land legislation was understood, in Congress, to refer to particular western States then in being—on paper. A law passed in the spring of that year[9] had outlined a double column of new States lying between the Atlantic seaboard States and the Mississippi River (Figure 2), whose boundaries, consisting almost entirely of parallels of latitude and meridians of longitude, were in effect

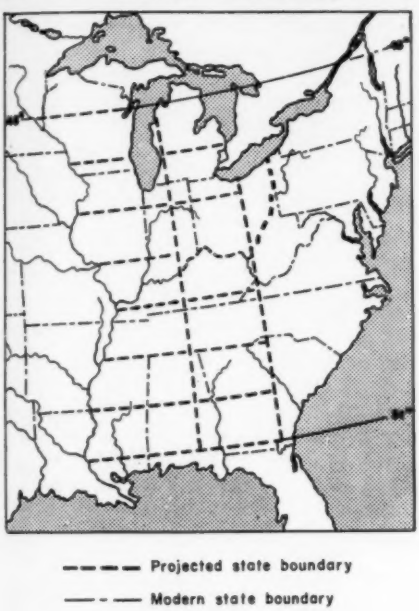


FIGURE 2.

an interlocking set of principal meridians and base lines. Under the Jefferson-Williamson plan, land subdividing was to follow State bounding and the lines defining hundreds were to be spaced out from the corners of the States, just as township lines would under later surveying regulations be spaced out from the intersections of principal meridians and base lines. The "boxing in" of error was also provided for, in that State boundaries would have enclosed and isolated the hundreds of each State.

No supplementary, corrective parallels and meridians within the States were suggested in the proposed land ordinance of 1784, but it would be unreasonable to suppose that surveying was expected to originate in only one corner of each State, and so allow errors to accumulate across the entire length and breadth of the State. Assuming a point of origin at every corner of a State or at such other places as Indian claims might allow there would have been "shatter zones" within the State where defective hundreds would have marked the collision of sets of lines of independent origin. (Such a zone lies near the eastern margin of Illinois, today.) These collisions would have curbed accumulating error effectively, if not as neatly as standard parallels and added meridians later did.

The paper States of 1784 never came into existence, it should be added, but their failure to materialize in no way reduces their importance to an understanding of the Jefferson-Williamson plan.

THE MAGNETIC COMPASS

Curiosity naturally arises as to how surveyors were expected to lay down the "due north and south" lines of the Jefferson-Williamson grid. On this subject the purposed ordinance read:

> The Surveyors shall pay due and constant attention to the variation of the magnetic meridian, and shall run and note all lines by the true meridian, certifying with every plat what was the variation at the time of running the lines thereon noted.

The background for this regulation is clear. Jefferson had already placed in a Virigina law, which was not passed, the requirement that each survey be represented on a "plot protracted by the true meridian . . . [showing] the variation thereof, towards the east or west, from the magnetical meridian."[10] Neither here nor later, in the national law, was abandonment of the magnetic needle proposed; Jefferson was simply requiring that a verified correction be applied to magnetic bearings, by which they would be converted to true bearings. By common reference to true north, separate Virginia surveys could have been related to one another in a fashion not otherwise possible. The disagreement of lines in a system of indiscriminate locations run with different compasses, at various times, and subject to local attractions, may be readily imagined. Unsuccessful in an attempt to remedy a confused situation in Virginia, Jefferson acted to secure the national grid against a comparable plight.

Use of the magnetic needle in land surveying was general in America at this time.

The instrument commonly employed was the circumferentor, a compass measuring about six inches in diameter, graduated to give readings in degrees, fitted with sight vanes, and mounted by means of a ball and socket on a staff ("Jacob's staff") or tripod. Of immediate interest is the fact that some of these circumferentors were so constructed as to allow the magnetic declination (or "variation," as expressed in the ordinance) to be set off. That is, the compass circle could be slightly rotated and fixed in a deflected position, such that corrected readings could be taken directly from the needle. Even without such an adjustment, corrections (in whole degrees) could be easily applied, of course.

It should be noted that surveyors, under the proposed ordinance, were to pay "constant attention" to the variation of the needle, and that the variations noted on the plats were to be based on readings "at the time of running the lines." The first caution probably referred to deflections caused by local attraction, but the second pointed to the author's awareness, or strong suspicion, that magnetic bearings were subject to change from other causes. In the face of these changes, how were the surveyors expected to check their needles?

Two relatively easy means of relating the magnetic bearings given by circumferentors to true bearings offered themselves: observation of the star Polaris, and observation of the sun at the time of its rising or setting. Jefferson favored ascertaining the magnetic variation at sunrise, when he later expressed himself on the subject, writing "To render these observations of the variation easy, and to encourage their frequency, a copy of the table of amplitudes should be furnished to every surveyor."[11] By amplitude he meant the angular distance north or south of due east at which the sun would rise on a given date. Of the alternative method, based on observation of Polaris, an American author wrote several years after the framing of the ordinance, "It has been adopted by many surveyors."[12]

SUMMARY

The familiar pattern of our Federal land survey system owes its rectilinear form to the Jefferson-Williamson plan of land subdivision in a proposed land ordinance of 1784. This plan, though primarily designed as a control over the traditional Southern system of indiscriminate locations, had two additional aims: the establishment of administrative areas favorable to the growth of local government, and a reform of American linear measurement through introduction into land surveying of the nautical mile. From this mile an entirely new series of decimally graduated units was to be derived. Finally, survey lines, laid down by corrected compass needle, were to be organized within a framework of State boundaries which, well in advance of their time, would have served as base lines and principal meridians.

REFERENCES

[1] This was the original plan before Congress, but it had various partial precedents in America and overseas which are discussed in William D. Pattison, *Beginnings of the American Rectangular Land Survey System, 1784–1800*, Department of Geography Research Paper No. 50 (Chicago: University of Chicago, 1957), pp. 57–66.

[2] Papers of the Continental Congress, No. 30, p. 59, Record Group 11, National Archives, Washington, D. C.

[3] Williamson to Governor of North Carolina, July 5, 1784, in Edmund C. Burnett (ed.), *Letters of Members of the Continental Congress* (Washington: Carnegie Institution, 1921–1936), Vol. VII, p. 563.

[4] David Hosack, *A Biographical Memoir of Hugh Williamson, M.D., LL.D.* (New York, 1820), p. 67.

[5] Thomas Jefferson, *Report of the Secretary of State on . . . Weights, Measures and Coins of the United States* (New York, 1790), p. 29.

[6] Jefferson to President of the United States, May 13, 1810, in Andrew A. Lipscomb and Albert E. Bergh (eds.), *The Writings of Thomas Jefferson* (Washington, 1903), Vol. XII, p. 393.

[7] Amelia C. Ford, *Colonial Precedents of Our National Land System as It Existed Before 1800*, Bulletin of the University of Wisconsin No. 352 (Madison: University of Wisconsin, 1910), p. 65; and W. A. Truesdell, "The Rectangular System of Surveying," *Journal of the Association of Engineering Societies*, XLI (Nov., 1908), p. 211.

[8] Jefferson to Francis Hopkinson, May 3, 1784, in Julian P. Boyd (ed.), *The Papers of Thomas Jefferson* (Princeton University Press, 1950–), Vol. VII, p. 205.

[9] Ordinance of 1784, in Worthington C. Ford *et al.* (eds.), *Journals of the Continental Congress* (Washington: Government Printing Office, 1904–1937), Vol. XXVI, pp. 275–278.

[10] "Bill for Ascertaining the Salaries and Fees of Certain Officers," in Boyd, *Papers of Thomas Jefferson*, Vol. II, p. 432.

[11] Jefferson to Governor of Virginia, April 19, 1816, in Lipscomb and Bergh, *Writings of Thomas Jefferson*, Vol. XIV, p. 483.

[12] Abel Flint, *A System of Geometry and Trigonometry Together With a Treatise on Surveying* (Hartford, Connecticut, 1808), p. 77. Flint described references to Polaris at elongation and culmination.

All Four Randall Family Men Members of ACSM

That the field of surveying and mapping holds a future for young men who desire to make it their profession is well exemplified by the men of the family of Robert Henry Randall, the first President of the ACSM. All of his sons, three of them—Robert H., Jr., William E., and Richard R.—have followed the strong beliefs and footsteps of their well-known father, and are professionally employed in some branch of the science.

Robert, a civil engineer and cartographer, is Deputy Director for nautical charts at the U. S. Navy Hydrographic Office. William, also a civil engineer, is a commissioned officer with the Coast and Geodetic Survey. Richard, a Ph.D. in geography, recently appointed Washington representative for Rand McNally & Company, has previously held cartographic assignments in the Federal Government.

To Dr. Robert Henry Randall—who has contributed more than many realize to the surveying and mapping profession—the above must be a warm and gratifying achievement.

ACSM salutes the four Randalls in the spirit of a sound belief in the surveying and mapping profession.

ERTEL

SELF LEVELING . . .

ERTEL Model INA Automatic Level

Sighting line is automatically brought into exact horizontal position

friction-free .....
2nd-order
accuracy .....
shock-proof .....

unaffected by
temperature
changes .....

Made in Western Germany

LEVELS IN HALF THE TIME REQUIRED FOR CONVENTIONAL SURVEYING LEVELS

PI

Write for descriptive Folder EZ
to PRECISION INSTRUMENTS, INC.
1400 FIFTH AVENUE, TROY, N.Y.

Policy in Regard to Consulting Land Surveying and Mapping Services*

Selection

The practice of land surveying is a learned profession requiring of its members sound technical training, specialized knowledge, broad experience, personal ability, honesty and integrity. The selection of surveying services by an evaluation of these qualities should be the basis of comparison rather than competitive bids.

Competitive bidding by land surveyors for employment on the basis of professional fees or charges is considered unethical practice by all professional surveyor groups, and makes it necessary for the surveyor to remove himself from consideration.

Since the securing of competitive bids for professional surveying services is not in the best public interest and as such procedure frequently results in the awarding of the work to other than the best qualified surveyor, the American Congress on Surveying and Mapping, Property Surveys Division, does now and herein express itself as opposed to competitive bidding for professional surveying services and recommends the practice of negotiating contracts in all cases where it may be necessary or desirable to consider the service of more than one surveyor consultant or organization.

Definition of Competitive Bidding

Competitive bidding for professional surveying services is defined as the formal or informal submission, or receipt, of verbal or written estimates of cost or proposals in terms of dollars, man-days of work required, percentage of construction cost, or any other measure of compensation whereby the prospective client may compare services on a price basis prior to the time that the surveyor, or one surveyor organization, has been selected for negotiations. The disclosure of recommended minimum or median fee schedules prepared by various surveyor societies is not considered to constitute competitive bidding.

Procedure for Negotiating

It is the policy of the American Congress on Surveying and Mapping that:

1. Any governmental unit, individual, or corporation desiring to procure the services of surveyor consultant or organization, which is unacquainted with the practitioners in the branch of surveying covering the contemplated work, should secure from the best available sources the names of several practitioners.

2. The client should discuss the proposed project with a practitioner or practitioners, considering background, experience, staff qualifications, present work load, and other factors deemed relevant for the successful handling of the project assignment.

3. After taking into consideration all of the pertinent factors, except fee, the client should select a firm for the work, subject to negotiation of a satisfactory contract.

4. In the event the client and selected firm are unable to negotiate a satisfactory contract, including fee, the selected firm should be notified, in writing, that it is no longer being considered, and the client should proceed with similar discussions with another firm in the same manner, and thereafter if the second negotiations are unsuccessful until satisfactory arrangements have been concluded with a qualified firm.

Pertinent Rules of Professional Conduct

Competition between surveyors for employment on the basis of professional fees or charges is considered unethical practice by all professional surveying groups. Any surveyor who is requested to submit a competitive bid to an owner or a governmental body should remove himself from consideration for the proposed work.

Should the surveyor be asked for a proposal to perform surveying services for a specific project, he should set forth in detail the work he proposes to accomplish and an indication of the calendar days required for its accomplishment. The surveyor's qualifications may be included if appropriate. A statement of monetary remuneration expected shall be avoided until he has been selected for the proposed work.

Should the owner insist upon a statement regarding remuneration prior to selection of the surveyor, the surveyor may designate the recognized professional society minimum fee schedule for the particular type of services required in the geographical area where the work is to be done.

* Adopted by the Property Surveys Division of the American Congress on Surveying and Mapping on March 22, 1961, and also adopted June 12, 1961, by the ACSM Board of Direction by letter balloting between May 1 and June 12, 1961. (13 Yes, 1 No, and 2 abstentions.)

Surveyors Take Giant Steps With Two-Way Radio

By A. W. HARRISON*

TWO-WAY RADIO fits surveying crews with "seven-league boots" in working across rugged terrain. Giving the transitman the means with which to talk as far as he can see, moves the entire crew twice as fast as a radioless team. In this and other applications of modern communications, my private engineering and surveying company in Andrews, Texas, has doubled its over-all efficiency and cut operating costs in half.

Our radio system includes a 60-watt base station, two "Private-Line" mobile units, and a high-gain antenna mounted 80 feet above our one-story office building. Operating on a high band frequency, we are able to effectively cover the county. With "Private-Line" radios, our network is isolated from outside interference and other organizations operating on the same frequency.

The "seven-league boots" of radio pay off for surveying crews whenever long distances and rough country are involved. One of our mobile units is in a company car; the other is in a pickup truck, connected to a speaker mounted on the back of the truck's cab.

In surveying boundaries and locations, one or both radios are used instead of hand signals to coordinate and speed up operations. For short distances, the flagman is often positioned by radio through the pickup's speaker, which can be heard a quarter of a mile away. On long-distance jobs, like an eight-mile pipeline we worked on recently, radio in both vehicles are utilized to locate points and position men. In this way, the transitman can send out precise directions as far as he can see through his telescope.

By talking a flagman down a line, fewer setups are required, misunderstandings are reduced, and minutes spent wandering "all over the pasture" are eliminated. The time saved in this type of operation alone is amazing. Radio on a day-to-day basis enables me to keep in touch with my field crews whether I am in my office or on the road. Instead of chasing a crew down to obtain information, I merely call them by radio.

Harrison crew member calls office to clarify job requirements, saving time and mileage of driving to a telephone to obtain the needed information.

If a client telephones or comes into the office while I am at a job, Mrs. Harrison, who serves as dispatcher, calls me by radio. I can make the required decision, give the needed information by radio, or return to the office if necessary.

* A. W. Harrison, Engineering and Surveying, Andrews, Texas.

Author Harrison radios answer to question from crew at the job site. Speedy means of resolving problems often saves three man-hours per day.

If the client wants some stakes replaced on a completed project, Mrs. Harrison routes a field crew to the site. If a small job comes in, such as a contour plat of a lot required by mortgage companies, she can send the order to the nearest crew. They might be able to pick it up on their way back from their current job, thereby saving miles and time.

The contact that the crews have with me and our office is equally important. Any problems or questions concerning interpretation can be settled immediately with radio. Otherwise, one of the men would have to leave the job site, drive several miles to a telephone or into town to get the information, thereby holding up the whole crew. Man-hours would be wasted (as many as three a day), vehicle mileage added, costs increased, and production reduced. Having two-way radio to instantly iron out these difficulties in work that requires exactness is worth an extra man on the payroll.

Being able to communicate quickly by radio and to know about problems as soon as they come up gives me two added personal benefits. First, it enables me to spend more time in the office working on engineering plans and other administrative matters.

Second, radio helps my peace of mind. I know what is going on without chasing all over the countryside to find out. If anything goes wrong, I am on the spot by means of radio.

I first considered using two-way radio in my work after noticing the time and other benefits a highway contractor gained from his system. I felt that I could realize similar savings in time and costs and increase our efficiency.

In 1958, I had two mobile units installed. The following year I added the base station, located on Mrs. Harrison's desk, in our outer office. My present investment in radio equipment totals approximately $2,500. In the near future, I plan to add another mobile unit in another pickup truck. With the efficiency, economy, and convenience which two-way radio adds to my operations, I wouldn't be without it.

Attention: PHOTOGRAMMETRY PROFESSORS ! ! !

. . . . COMPLETE MULTIPLEX UNITS FOR SALE . . . .

Reduced Prices . . . "Ideal for Training" . . . Excellent Condition

PACIFIC AIR INDUSTRIES

725 E. 3rd St., Long Beach 12, California — Ph.: HE. 583-26

When Is a Line?

By GURDON H. WATTLES

TO MANY PEOPLE, who have little or no occasion to make conveyances of property, there is seldom any realization that there is more than one possible position for the boundary line of any property. A one and only position of course would be Utopian, but various and sundry causes have resulted in many complications in defining some boundary lines. So, unfortunately, one rule alone will not suffice to work out all the solutions necessary.

Therefore, in order to settle on some general groove of thought for the discussion at hand, we will consider that a line which determines the demarcation of property is true and correct and carries the weight of decision when, it has the preponderance of delineation in words and numbers which fits with all correlated parts of the whole description.

Multiplicity is sometimes complicity—and it certainly is when more than one line is claimed for ownership. Mere claim, however, is not sufficient unto itself.

Let us consider this example.

Assume that three different lines have been created and claimed as boundary between two holdings of title; a fence line, a tax line, and a survey line. The fence line has been in existence over twenty years and has been acquiesced in by various successive owners who for many years were unaware of the possibility that it was not coincident with their true line. The tax assessor's office has been collecting taxes all this time on the basis of a line produced northerly from the east line of an old subdivision on the south, and which line was nearly parallel with the fence but a few feet east of it. The more recently surveyed line is some 53 feet east of the fence and was brought into being by reason of the fact that the land was becoming more valuable, and a proposed transaction was to be based upon the survey for determining the payment of so many dollars per acre. (*See* Diagram 1.)

An interesting fact that courts have pointed up in their various findings is that at the moment there is recognition of a line other than the one acquiesced in, then acquiescence, as such, ceases to be. As long as adjoining owners hold their occupation on a line of acquiescence, their condition is status quo and the excess or shortage is held by the same tenure as that holding the main body of land. If either owner, however, decides to transfer title to or from that acquiesced in, the conveyance out will not hold without a document containing words of conveyance between the adjoining owners for that portion of the land not included within the grantor's original description.[1]

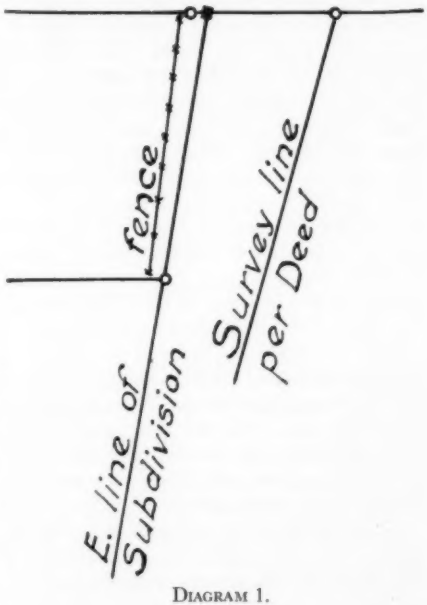


DIAGRAM 1.

In our case at hand, the moment the adjoining owners on the west realized that the line to which they had been paying

[1] Ogden's California Real Property Law.

taxes was a few feet east of the fence, the value of the fence as a line dropped in favor of the tax line. Then when these owners soon after learned that their line of title as developed by the survey was some 53 feet east of the fence, the value of that tax line to them dropped in favor of the title line. Conversely, the owners on the east intensified their evaluation of the tax line over the title line because they had been paying taxes thereto for over 30 years. Now it appears that the fence has been eliminated from the problem, and well it could be in consideration of the fact that it was for stopping cattle, therefore, "where acquiescence in a fence is as a barrier and not as a boundary line, no agreed boundary is established."[2] On the other hand, the payment of taxes on land *not* included within the description is *not* effectual to complete title by adverse possession.[3] And, "the payment of taxes by the adverse holder on a designated parcel of land is not effectual to complete a prescriptive right to land not included within that designation."[3a] Also, in California, such title is not a "marketable title," i.e., one "free from reasonable doubt and fairly deducible from the record," which a purchaser can be compelled to accept (Gwin *v* Calegaris, 139 Cal. 382), until the title is established by judicial proceedings against the record owner, even though "no title can be better or more absolute" than that acquired by adverse possession according to Woodward *v* Faris, 109 Cal. 12, 18.[3b] These decisions would seem to knock out the tax line as a claimed boundary until or unless a quiet title action is instituted and a judgment rendered in favor of the occupants on the east, although the money paid for taxes on the disputed area might constitute a separate claim by itself.

Five elements are required to establish adverse possession sufficient to constitute a defense under the statute of limitations:

1. The possession must be actual occupation, open and notorious, and not clandestine.
2. It must be hostile to the true owners.
3. It must be held under claim of title exclusive of any other right, as one's own.
4. It must be continuous and uninterrupted for a period of 5 years prior to commencement of action—not, however, necessarily the next before commencement of action.
5. It must appear that claimant has paid all taxes levied or assessed on the land.

Generally there must be concurrence of all these elements.[3c]

By analysis of a Record of Survey map which showed the proper division of the section and on the line in question showed two old monuments in the area of the northerly prolongation of the said east line of the old subdivision, with a note that a fence was west of this line, it might be deduced that the fence was built upon the assumed correctness of these monuments but without verification of them. Whether claims of control or rights are based on survey monuments such as 4 x 4 stakes, pipe, etc, or on occupational monuments such as a fence, ". . . the statutory rule for preference of monuments over measurements is for the purpose of a crutch for construing a description and does not mean that the court may go outside the instrument to find a monument not mentioned therein as a means of making the instrument fit the monument."[4]

Having now carried our line of thought thus far through these various channels, it appears that, by these circumstances and without the benefit of a quiet title action, the limit of the land to which either party has the right to convey (except to each other if they are to establish an agreed line) is not the fence, nor the tax line, but only the line of title as described in the description in their deeds, because "where there is acquiescence in a wrong boundary

[2] Chandler *v* Hibberd 165 ACA 54; Talmadge *v* Moore 98 Cal. App. 2d. 481.

[3] 2 Cal. Jr. 2d. Sec. 72–173.

[3a] Eberhardt *v* Coyne (1896) 114 C 283, 46P84.

[3b] Ogden's California Real Property Law, 5.28.

[3c] Comstock *v* Finn (1936) 13CA2d 151, 56P2d 957.

[4] Williams *v* Hebbard 33CA 2d. 636, 92P2d.

and the true boundary may be ascertained by the deed, the acquiescence is treated both in law and equity as a mistake and neither party is estopped to claim to the true line."[5]

From the standpoint of the surveyor, he should show on his map all three lines with their proper identification.

On the other hand, suppose a right-of-way agent's inspection of the ground would lead him to believe that the area immediately east of the fence would be apropos to a new pipe line easement, and, of course, in talking with the people on the east, he was led to believe (and without wrong intent) that they would have the right to grant his company that easement. So, unless he would get a survey or analyze the Record of Survey map on file in the courthouse, he might not even suspect that his acquisition of this particular piece of right of way would be null and void for having a grantor who could not grant. This is an example of how wary the right-of-way agent must be, and how valuable it is for him to get a Title Attorney's Abstract or Title Company's report on the vesting of the land in which he is interested.

Now, for contrast, let us consider an actual agreement line established by a document setting forth a mutual understanding between two certain adjoining parties and with specific words of conveyance to each other on each side of the line agreed upon. The first impression seems to indicate a perfect deal—but—consider the facts indicated on Diagram 2. A, B, and C held adjoining titles which by description had their respective boundaries common. The easterly fence line, though crossing all three areas, had been used as the line of demarcation for many years between B and C who entered into said agreement and with proper words of conveyance established the fence line as their boundary. Note, however, that C's occupation to the fence included a triangle of A's property, but A was not asked to join in the agreement!

Now, if a surveyor was asked to survey these lands, he should show *all* these facts and submit to his client that a proper written agreement with words of conveyance, etc., including *all* parties would adjust the title from the old lines to the occupied lines. Because, similarly, if A and B entered an agreement without C, the triangular area at the southeast corner of the fenced-in area would not pass from C to B even if B did abandon all the area easterly of the fence.

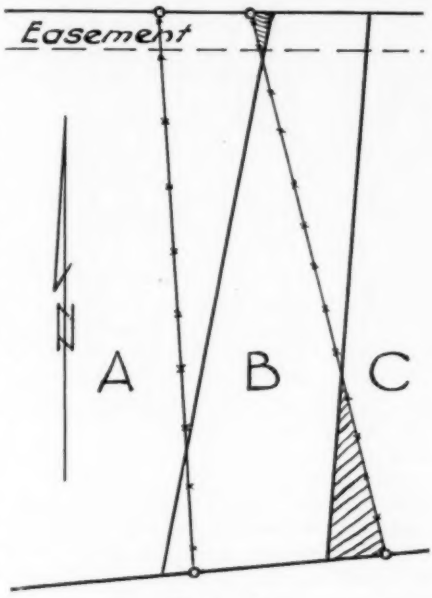


DIAGRAM 2.

This situation would be interesting for a right-of-way agent working on the acquisition of an easement along the northerly line of the lands of A, B, and C, whether he came upon it before the agreement was made or afterward. In the case of C's grant, if prior to the agreement, he used the form; "That portion of C's land included within the easement strip" he would get no legal rights from C to the portion between C's westerly line and the fence to which C claimed. And, if he used the same form after the agreement, he would get no legal rights from C to the portion between B's westerly line and the

[5] Williams *v* Barnett 135 Cal. App. 2d 607. Pra *v* Bradshaw 263 P. 2d 52, 121 CA 2d 267.

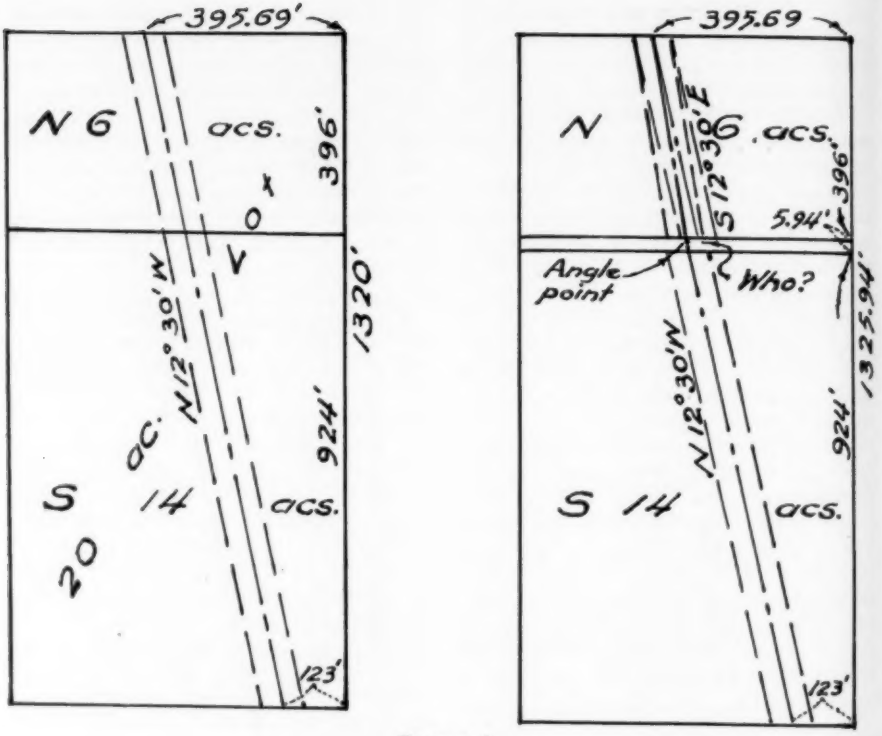


Diagram 3.

fence to which C would claim under the agreement, because A did not consent to the relinquishment of *his* title to any portion easterly of the fence line. Even if this agent used the limited-form description covering only the segment of the strip applicable to the title of A or B or C, he would have the same problem. This is a case where it would be most certain if the agent could get A, B, and C to all sign one instrument covering the easement from the easterly line of C to the westerly line of A.

It is not uncommon to find excess or shortage in a series of lots, especially in those shown on old maps where there is some question as to how much actual ground work in the form of surveying was done, and today's field work clearly shows the differences, as is illustrated in left portion of Diagram 3.

With an easement diagonally across the land, an interesting situation arises in writing the description. The scrivener began the certerline of the easement at a point on the south line of the easement at a point on the south line of the lot, 123 feet west of the southeast corner; thence N 12° 30′ 00″ W to the north line of the south 14 acres of said lot, for the southerly parcel; and began at a point on the south line of the lot, 123 feet west of the southeast corner; thence North 12° 30′ 00″ West to the north line of the south 14 acres of said lot and the true point of beginning; thence N 12° 30′ 00″ W to a point on the north line of said lot 395.69 feet west of the northeast corner thereof, for the northerly parcel. Well and good, because, insofar as the record was concerned, the calculations fit. However, by inspection of the right portion of Diagram 3 showing the measured

facts, it is clear that the above form of description would necessitate an angle at the north line of the south 14 acres in order to meet the tie on the north line of the lot, and the easement would also traverse the sliver between the two parcels.

If, on the other hand, the scrivener had used the reverse order for the northerly parcel and said; beginning at a point on the north line of the lot, 395.69 feet west of the northeast corner; thence S 12° 30′ 00″ E to the southerly line of the north 6 acres, he not only would leave a gap, but even the prolongations of each strip would be offset one from the other.

Neither could the scrivener use the inclusive form of that portion of the south 14 acres included within the following described strip, and that portion of the north 6 acres, etc., etc., and use the centerline based on the ties by record, because the prolongation of the lot as revealed by measurements would cause an uncalled-for angle in the line and traversing an intervening segment of land the ownership of which was not known. So—which line should be used? When is it possible, or is it possible, to use record information to accomplish the goal when actual measurements to the contrary are not minor but major differences from the record?

In this case at hand each owner had bought his respective number of acres and had lived in the firm belief that that was exactly what he had, and, each having planted oranges and each having used the open area along their adjoining boundary as a common turn-around for their cultivation equipment, they, therefore, had no definite line of demarcation between them.

When the scrivener was confronted with the facts of the excess, he queried upon which basis to set up the parcels for the right-of-way acquisition:—

1. Prorate the acreage?
2. Determine which one was sold first and then give the excess to the other?
3. Keep them separated and find out who owned the strip in the middle?
4. Take the easement straight through and let someone else worry about the gap between?

If the easement were parallel with the side lines, the matter of alignment would be simpler, but with the diagonal requirement the gap must be considered in order to retain alignment.

This is the type of situation where the Title Company or the Title Attorney can be called upon to render the decision and cover the interest, or interests, in the strip for the protection of the acquirer.

Now to consider a line qualified by "north." When is the line north, and which north? This may sound paradoxical and frivolous, but it has been one of the main questions involved in several court cases. To begin with, the statement "due north" has been erroneously used in lieu of "true north." The courts have held that if the described line was established as on the astronomical north, then it was "true" north. The relation of the "north" line to the next preceeding and the next following lines would depend upon the base of bearings and the wording of the description. If the bearings are based upon some deed or map of which there is no proof of it having coincidence with, or development from, an astronomical north, and the courses before and after the north are stated as bearings, then the "north" would be developed from the angular relation which the mathematical difference would render it. However, if the description follows the form: thence westerly along the northerly line of John Jones' land; thence north 200 feet; thence westerly along the southerly line of George Adams' land;—then the courts have held that this north would be represented properly by "true" north established from astronomical determination. The same conclusion would be held in regarding east or south or west as being "true" in such a description, and these directions would also be established from astronomical derivation.

It must be remembered, however, that "true" east or west developed from true north would follow a line of latitude on the curve of the earth and would, therefore, not continue as a line at right angles from

true north beyond the first instant. Synonymically, astronomical north means a line which runs north on a meridian of longitude,[6] and east and west would be at right angles therefrom for the first instant, as mentioned above, and that for every certain unit of distance away from a line of longitude, the right-angle relationship must give way to a correction dependent upon and proportionate to the latitude. The only place that the right-angle line would continue [east] around the earth is at the equator. (*See* Sections 127 et seq in the *Manual of Surveying Instructions* by the Bureau of Land Management for details on deflections.) Also, "north" may represent an actual bearing, or a directional position, but "northerly" is purely directional, except that legal construction of "northerly," when not qualified by the context, is taken to be astronomical north or a "north" bearing on the same base of bearings of the description.[7]

Various dictionaries cite the meaning of "due" in the category of adverb when used as "due west," etc., as "particularly" or "directly." In these uses of "due" the connotation is in the sense of being generally specific but not 10°, 15°, or 20° away from the north, south, east, or west direction, in contrast with a "true" direction which must be inceptively astronomical.

On occasion one finds a description written as: Beginning at the northeast corner of the southeast quarter of said Section 9; thence south 4 chains; thence west 10 chains; thence north 4 chains; thence east 10 chains. It is almost a safe bet that the quarter-section line is not at 90° from the east line, and it is also pretty safe to assume that the said east line is not now a "true" north or south line; therefore, what denotation will solve the riddle of the direction of these lines? If you assume the east line as north or south, the closing line in the description probably will not be on the quarter-section line, and if the east line is not north or south then probably neither the north nor the east lines of the property in question will coincide with the quarter-section boundaries. In looking for some help on this problem, if there are some fence lines or other occupation, which will offer an indication as to the intent or understanding of the owners in this area, they may be the only solution to this over-simplified statement of land boundaries. It was probably rendered on the assumption that everything was a square or a parallelogram but without ties to the controlling boundaries of the quarter-section, so the certainty of the conveyor's intent was lost. Sometimes a clue can be found in the description of the adjoining property which may have been written by someone other than the writer of the first one, and who, with more knowledge of the facts, disclosed more certainty in the calls.

For proper orientation, every map and every description should have a "base of bearings," that is, a certain bearing assigned to a certain line. Occasionally, because of unrelated facts, it may be necessary to change the base of bearings within the description; that is, the first part may start on a bearing shown on a Tract Map and then, because a boundary in the description is based upon an external survey to which no relation is known from the said Tract Map and to which the angular tie is incomplete, a tie must be made to and along the boundary description, which then establishes a new bearing base from there on. This means that the lines in the area of the change-over must be given careful consideration in order to assign them their correct juxtaposition.

Often the same line which is designated "north" at its inception later becomes a line of different bearing, not because of any desire to change the bearing but just due to the chain of circumstances surrounding the condition. This is not unusual in the case of re-establishing government surveys. Basically the range or meridional line (the north-south line on the east side of a township) and the interior north-south section lines are established on a true

[6] Richfield Oil Corp. *v* Crawford, 39, Cal. 2d. 729.

[7] *Land Survey Descriptions*' by William C. Wattles.

meridian or "north" course by a solar or celestial observation on the range line, because the interior north-south section lines are supposed to be parallel with said east line. An interesting sidelight on this procedure is given in Section 177 of the *Manual of Surveying Instructions* by the Bureau of Land Management, which says, "The meridional section lines will be initiated at regularly established section corners on the south boundary of the township and will be run from south to north parallel to the governing east boundary, . . ." A line which is not the east boundary of the township cannot be both meridional (of the meridian) and parallel with a meridian line which is some distance from it. However, when the lines are rerun in later years by following monuments and topographical calls and then orienting the rerun line with a new solar or polaris observation, and even with consideration given to the magnetic declination over the intervening years, because many of the original surveys were run via compass, the final result is usually off from true north, the amount dependent upon the circumstances. *See* Diagram 5 for one example.

In Section 124 of the *Manual of Surveying Instructions* by the Bureau of Land Management, this relationship is discussed and its method of development outlined, and it speaks of "due east or west" as the *general* direction, not the true line. It goes on further to say, "the directions of all lines are stated in terms of angular measurement referred to the true north (or south) at the point of record." Note that for the fundamental basis of orientation, the *Manual* calls it *true* north (or south).

The use of certain natural lines where crossed by a survey line for the defining, holding, and relocating of that survey line, and monuments on the line at a later date, has been held by the Bureau of Land Management and the courts in various States to be paramount. This is the basis upon which many relocation surveys reveal that section and township lines are different from the way they are shown on the official Township Plat. For instance, if the west,

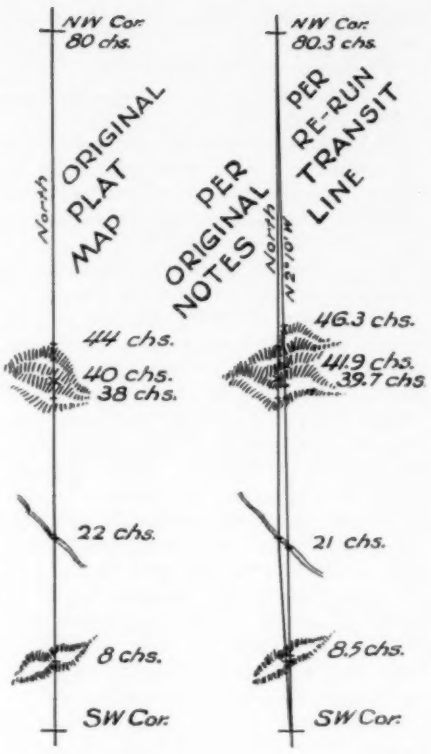


DIAGRAM 4. DIAGRAM 5.

quarter-section, corner monument was gone and it was necessary to re-establish it from the following notes in the Surveyor General's Office:—

"from the southwest corner of section, north on west line,
8 chains, top of ridge northeast–southwest,
22 chains, gulley 6 links wide, northwest,
38 chains, ridge northwest–southeast, descend,
40 chains, set 6″ × 8″ × 26″ sandstone 13″ in ground marked ¼ on east face,
44 chains, toe of hill,
80 chains, set 4″ × 5″ × 18″ granite stone for section corner.

but, the actual measurements on the ground are:—

8.5 chains, top of ridge,
21 chains, gulley,
39.7 chains, ridge,
46.3 chains, toe of hill.

Apparently the calls were false calls for distances in the field notes, but they were good calls to natural monuments on the resurveyed line.

". . . In establishing a disputed corner, those objects intended to mark the corner, and referred to in the notes of the original survey as being *nearest the corner,* are, when satisfactorily established, *stronger* evidence than objects more remote. . . ."[8]

Also, ". . . in a case like this, where the locative monument is gone and the place incapable of identification, where distances noted in the survey as locative of the corner are manifestly erroneous, such distances should give way to the natural objects noted and found upon the ground at approximately the distances given in the notes, even if the calls for such natural objects are incidental and not 'locative'. . . ."[9] Therefore, in this case, the two nearest monuments should be used for determination of the quarter corner; however, the distance measured between the said two monuments is 0.6 chains more than stated in the Government Survey notes. Should the closer one of the two objects be used for control with a flat call distance, or should a proration be held between the two? Inasmuch as the courts have held to the use of plural objects, and for the lack of any other more definite fixes, the "last resort" may be taken and the quarter corner relocated by proportion between the two adjoining objects. ". . . and the proportional method is to be used only when no other reasonable method is possible and it must be so used that it does not contradict or conflict with the official data that are not impeached. . . ."[10] This will then result in the restored quarter corner being located at 41.9 chains (39.7 plus the proportion of 2.2) instead of 40 chains from the southwest corner, and is not an overall proportion either.

Supposing, however, that the Government notes had referred to no other topography between the quarter corner at 40 chains and the northwest corner set at 80 chains, then the final repositioning of the quarter corner would be made at the flat call of 2 chains from the ridge which would place said quarter corner at 41.7 chains.

To consider what possibly happened, compare the last two diagrams. Diagram 4 is the way the Official Plat was illustrated by the original surveyor, while Diagram 5 shows what the later survey revealed. There may have been a local magnetic attraction which swerved the first surveyor westerly of the "north" which he supposed he ran and, therefore, gave him the distances recorded from one natural object to the next, but which, when measured on a straight line between the original monuments at the southwest and northwest corners of the section by a transit instead of by compass, resulted in a different bearing for the line as well as changes in distances along the line.

This could go on at great length citing example after example from the well of disputed cases, but the thought to remember is that, if the conditions inherent within the line and the qualifications supporting its relation to the whole are not sufficient, or leave room for question, then reconsideration should be given to the factors which confer preponderance of delineation to the line before accepting it. When individuals or corporate entities deadlock in an attempt to agree upon a boundary line and go to court for a decision the court reviews the facts and delineates them in such a way as to be able to reach a conclusion. Therefore, extensive analysis of all the facts available may be the open door for a decision without resorting to court action.

[8] Churchill Co. *v* Beal (1929) 99 Cal. App. 482, 487.

[9] Weaver *v* Howatt, supra 171, Cal. 302, 308.

[10] Weaver *v* Howatt (1911) supra, 161 Cal. 77, 84.

Rotoverser

By KENNETH DEARDORF

AERONAUTICAL CHART AND INFORMATION CENTER

ABSTRACT: The "Rotoverser" is an optical device attachable to the lens mount of the conventional copying camera, to permit the making of a right-reading, upright image in the camera. Separate exposure to accomplish this is thus eliminated. The image reversal is done with a dove prism. Unlike mirror systems, no deviation of the projection axis is caused.

CAPABILITY and flexibility of copy cameras will be enhanced by the use of a new device described as a *"straight line* image reverser and orientor." The words "straight line" in the preceding statement have been deliberately emphasized because, as is well known, an image can also be reversed by reflecting it from a mirror, or a series of mirrors, usually three. However, single-mirror reversal deflects the projection axis from its initial direction, while three-mirror systems, although continuing the axis in the same direction, offset it from its original path. In the first instance, the copying system becomes highly inflexible. The three-mirror system is less limited, but full easel capacity is prevented unless expensive shifting mechanisms are provided. In either case, image adjustment is complicated by the axis displacements.

The purpose of such devices is, of course, to counteract the image reversal inherent in the conventional camera lens. The increasing utilization of "direct positive" films, plus the continuing development of the diazos and the electrostatic media, which permit direct positive-from-positive copy, make it desirable to be able to produce a right-reading image in the camera itself, without recourse to the traditional extra contact printing step for this purpose. The "Rotoverser" uses a dove prism to obtain the desired effect. The prism is mounted in a cylindrical barrel which attaches in front of the camera lens, becoming virtually an extension of the camera lens system. The axis of projection is in a straight line all the way from easel to film plane.

This last condition permits a motion not possible with the mirror devices: complete rotation of the image without shifting it either laterally or vertically, and without having to disturb either the easel or the camera. In addition, the image can be manipulated by the usual lensboard and camera-back adjusments, in the normal manner.

It may be pertinent to clarify this image-rotating function as quite distinct from the basic image-reversing function of the dove prism. Rotating the barrel in no way affects the basic function—it merely rotates the already-reversed image about its own center. Of passing interest may be the fact that the image rotates twice as rapidly as the barrel. That is, a 90°turn of the barrel rotates the image 180°, and so on.

As shown in Figure 1, a hinged attach-

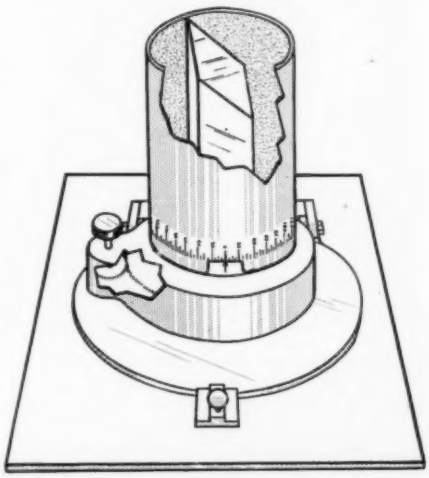


FIGURE 1.—The Rotoverser.

ment to the lensboard is provided, so that the Rotoverser can be pivoted to one side when not in use. Also indicated is the ring and pinion gear arrangement for precise control of the image-rotating function. Presumably, if a given application does not warrant these refinements, a simple bayonet mount will suffice. However, to take full advantage of the "straight line" principle, alignment must be very accurate.

Figure 2 illustrates the path of an image through a dove prism. Note that the image is tumbled "end-for-end" by its transmission through the prism, while its "sides" are not interchanged. It is this effect, counteracting the reversing action of the camera lens, which produces on the camera film plane an image aligned in all respects like the original.

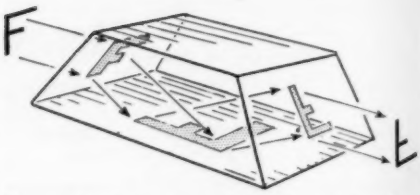


FIGURE 2.—Image reversing action of the dove prism.

This instrument was designed by Ernest R. Swanson, Specifications and Techniques Office, Aeronautical Chart and Information Center, St. Louis, Missouri, who also coined the name "Rotoverser" to aptly describe its combined rotating-reversing function.

Officers—First General Assembly International Cartographic Association, Paris, France, May 29 to June 3, 1961

Front row, left to right: Brigadier Lewis John Harris, London, England; Duncan M. Fitchet, Boston, Massachusetts. *Back row, left to right:* Vice President Stephane de Brommer, Paris, France; Brigadier Denis Edward Osbert Thackwell, Southampton, England; G. K. Emminizer, Jr., Washington, D. C.; President Prof. Dr. h. c. Eduard Imhof, Zurich, Switzerland; Dr. Karl M:son Mannerfelt, Stockholm, Sweden; Secretary-Treasurer Dr. Erwin Gigas, Frankfurt, Germany; and Col. Carlo Traversi, Florence, Italy.

The Watts Master Compass

By D. R. STANLEY

DIRECTOR, HILGER & WATTS LTD., LONDON

THE Watts Master Compass is a new instrument for determining the direction of the magnetic meridian to an accuracy of 1 minute of arc. Such an instrument is required to standardize field compasses, which may be subject to various errors, either in manufacture or in their index adjustment, and in the making of an accurate, magnetic-variation survey where an absolute instrument is essential.

The novelty of the new instrument lies in the fact that it is not a laboratory instrument but may be readily set up in the field. In fact it is quite a simple attachment to a transit and, without reference to any other standard, will determine the direction of the meridian absolutely. The attachment contains a pivoted, magnetic needle and a reading system, and, in order to eliminate the systematic errors which may occur due to misalignments between the axis of magnetization of the needle and its index, the needle has a double bearing and two pivots, so that it can be turned upside-down and a second observation taken. Furthermore, in order to eliminate an index error between the compass-reading device and the axis of the telescope, the compass unit itself is, in fact, attached to the end of the trunnion axis. The operation of changing the telescope from direct to reversed position, therefore, turns the whole compass upside down and changes the signs of these two systematic errors. Before I go on to describe the compass itself, Figure 1 shows the Microptic Transit fitted with the compass attachment. The Microptic Transit is a simple, glass-circle instrument which can be easily read to 1 minute of arc and is, therefore, a suitable instrument for making magnetic observations, because any greater accuracy in reading would be rendered superfluous by the daily variation of the magnetic meridian.

FIGURE 1.—Microptic Transit.

Figure 2 shows a section of the compass unit and indicates the novelty in the magnet of the reading system. The magnet consists of two magnetized rods attached to a centerpiece, carrying a double-ended sapphire bearing. The sapphire slides within its holder, so that when suspended on either pivot the bearing cup is above the center of gravity. A copper block is close to the north end of the magnet, and oscillations are damped by eddy currents set up within it. The position of the magnet is observed by what is called an autocollimating telescope, and for this purpose a small mirror

Presented at the 21st Annual Meeting of the American Congress on Surveying and Mapping, Washington, D. C. March 22–24, 1961. The paper was read by Eric J. Schneider.

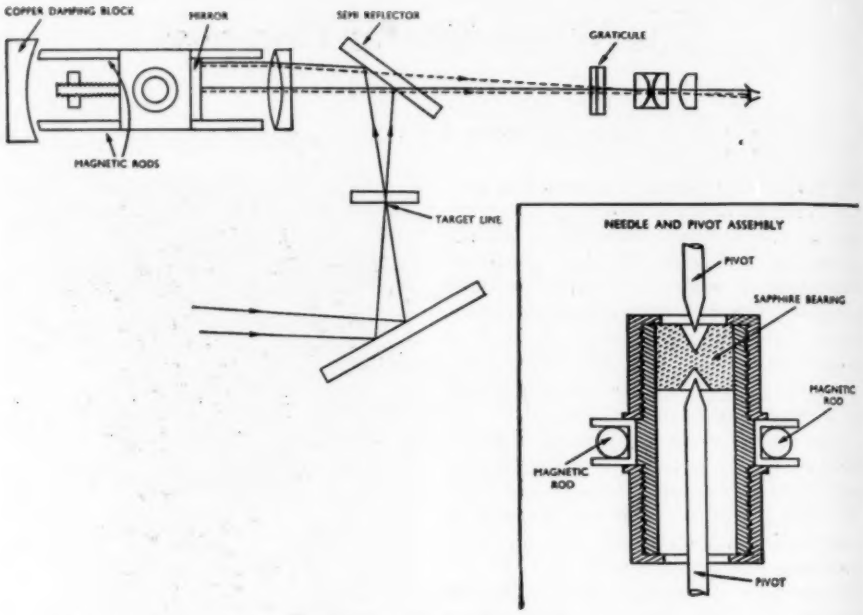


FIGURE 2.—Section of compass.

is mounted on the centerpiece of the magnet and between the two rods. The autocollimating telescope has a target reticle which is illuminated by an external mirror, and light is reflected, from a semi-reflector within the telescope, out through the objective lens. The emergent beam is collimated, that is, the rays of light are parallel. When they strike the mirror on the magnet, they are reflected back into the telescope and, passing through the semi-reflector, form an image of the target lines in the focal plane of the eyepiece. Here there is a reticle scale which is graduated in 5-minute divisions and estimations can easily be made to 1 minute. The advantage which this reading system gives is that, due to the reflection of a parallel beam of light, small sideways displacements of the magnet produce no change in the reading of the scale. Therefore, variations in the exact position of contact between the pivot and the cup do not introduce any reading error. The scale reading is dependent solely on the angular relationship between the magnet assembly and the autocollimating telescope. Furthermore, by the use of this optical system which provides a scale, the instrument need not be rotated in order to bring a setting mark to a position of reading or coincidence.

The magnet may be allowed to oscillate and come to rest in its natural position, and the reading of the scale can then be taken. The magnet can be disturbed and a number of readings may be taken, the mean of which will eliminate unsystematic errors due to pivot striction.

I referred earlier to the fact that the compass was mounted on the end of the trunnion axis and that by changing from direct to reversed position the systematic errors were reversed. It may now be seen that the systematic errors referred to are, in fact, errors in the position of the mirror, which should nominally be at right angles to the axis of magnetization, and errors of adjustment in the autocollimating system, the axis of which should nominally be at right angles to the trunnion axis.

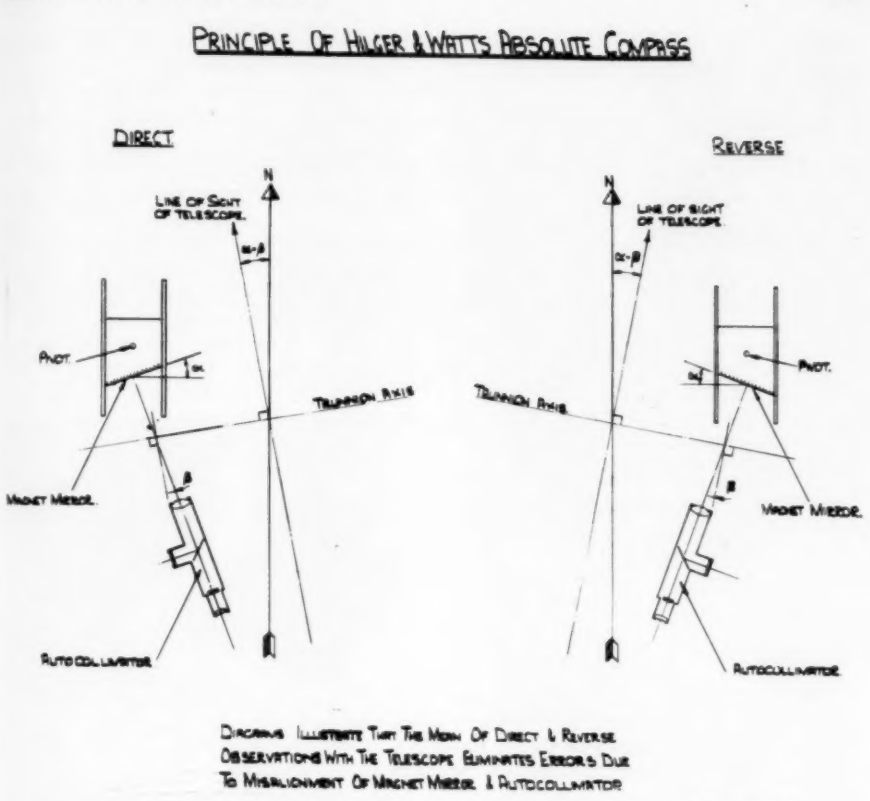

PRINCIPLE OF HILGER & WATTS ABSOLUTE COMPASS
DIRECT
REVERSE
N
LINE OF SIGHT OF TELESCOPE
α-β
PIVOT
TRUNNION AXIS
MAGNET MIRROR
AUTOCOLLIMATOR
DIAGRAMS ILLUSTRATE THAT THE MEAN OF DIRECT & REVERSE OBSERVATIONS WITH THE TELESCOPE ELIMINATES ERRORS DUE TO MISALIGNMENT OF MAGNET MIRROR & AUTOCOLLIMATOR

FIGURE 3.—Effect of errors in mirror and autocollimators when compass is reversed.

As can be seen from Figure 3, these errors have an equal but opposite effect when the compass unit is turned over. The fields of view of the compass reading and the circle reading systems of the transit are illustrated in Figure 4.

Figure 5 shows the interior of the compass in which can be seen the two parallel rods, the mirror mounted between them, the copper damping block, and part of the clamping device for the needle. This is operated by the knurled knob on the outside of the cover plate. Because all systematic errors between the compass unit and the transit telescope are eliminated by the process of taking direct and reverse readings, no great precision in alignment of the compass unit is necessary, and it can be freely removed and stowed separately in the packing case, as shown in Figure 6.

The actual method of using the instrument is as follows:—

The instrument is leveled on its tripod,

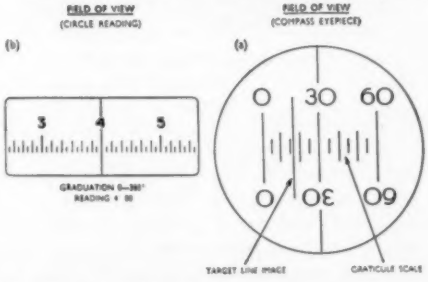


FIGURE 4.—Fields of view of compass reading and horizontal circle of transit.

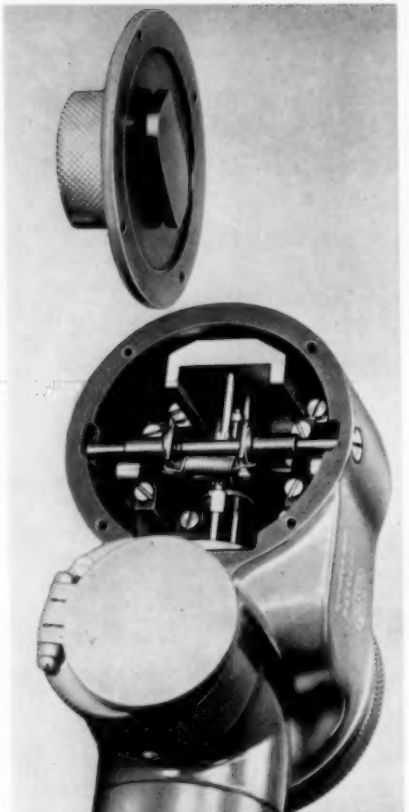


FIGURE 5.—Compass interior.

with the compass unit on the left of the telescope. The telescope is turned towards the reference object. The upper and lower plate clamps and the telescope clamp are tightened, and exact pointing is made by means of the upper tangent screw and the telescope tangent screw. The reading on the horizontal circle is noted.

The upper clamp is then released and the instrument is turned so that the telescope is pointing in the direction of the meridian. The telescope is set approximately horizontal, and the compass needle is released. The instrument is turned until the image of the target line is seen in the eyepiece of the compass. The upper plate and telescope clamps are tightened, and the image is positioned on the scale by means of the tangent screws. Several compass readings are taken, raising and lowering the magnet in between each, and the mean reading is recorded. The horizontal circle reading is noted.

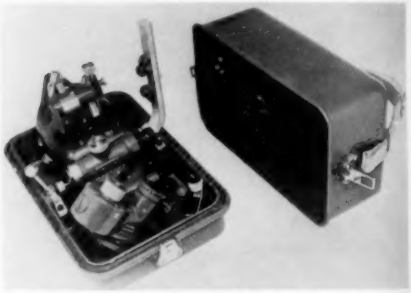


FIGURE 6.—Instrument in packing case.

The telescope is unclamped and rotated through 180 degrees. The upper plate clamp is also released and the instrument is turned 180 degrees, so that the compass is now on the right of the telescope. The telescope and upper plate clamps are tightened, and the tangent screws turned so that the image of the target-line again appears on the scale. A similar series of compass readings is taken, and the mean reading is recorded. The horizontal circle reading is also noted.

The upper plate clamp and the telescope clamp are released, the telescope is pointed to the reference object and the horizontal circle reading is taken.

The apparent magnetic bearing of the reference object is then calculated for the "compass left" and "compass right" positions. The true magnetic bearing of the object is the mean of these two values. Examples of typical readings on the Master

TIME	COMPASS LEFT					COMPASS RIGHT					TRUE BEARING
	1	2	3	4	5	6	7	8	9	10	11
	Ref. Object	Compass Azimuth	Compass Readings	Compass Azimuth Corrected (2–3)	Apparent Magnetic Bearing (1–4)	Ref. Object	Compass Azimuth	Compass Readings	Compass Azimuth Corrected (7+8)	Apparent Magnetic Bearing (6–9)	$\frac{5+10}{2}$
12.30	40° 39′	56° 49′	6, 6, 7, 5, 6, mean 6′	56° 43′	343° 56′	220° 34′	236° 29′	9, 10, 9, 9, 8, mean 9′	236° 38′	343° 56′	343° 56′
12.45	312° 12′	328° 31′	11, 12, 12, 11, 12 mean 11.8′	328° 19.2′	343° 52.8′	132° 07′	148° 00′	13, 13, 12, 13, 14, mean 13′	148° 13′	343° 54′	343° 53.4′
14.30	187° 56′	204° 11′	9, 8, 8, 9, 9, mean 8.6′	204° 2.4′	343° 53.6′	7° 54′	23° 52′	4, 5, 3, 4, 4, mean 4′	23° 56′	343° 58′	343° 55.8′
14.45	238° 45′	255° 01′	11, 12, 12, 11, 12, mean 11.8′	254° 49.2′	343° 55.8′	58° 41′	74° 35′	9, 9, 8, 8, 8, mean 8.4′	74° 43.4′	343° 57.6′	343° 56.7′

FIGURE 7.—Examples of typical readings and method of calculating the magnetic bearing.

Compass and the method of calculating the magnetic bearing are shown in Figure 7.

Column 1 shows the azimuth-circle reading when the telescope is pointed to the reference object.

Column 2 shows the azimuth-circle reading when the instrument is turned into the meridian.

Column 3 shows the repeat readings of the compass scale. The mean of these readings is applied as a correction to the entry in column 2, and the corrected value is entered in column 4.

From columns 1 and 4 the apparent magnetic bearing of the reference object is calculated. The process is repeated in the reverse position with the compass on the right and a second value in column 10 is obtained for the apparent magnetic bearing. The mean of these two readings, columns 5 and 10, eliminates all the systematic errors.

The variation between the magnetic and geographic meridians may subsequently be found if the geographic bearing of the reference object is determined by the usual procedure of taking astronomical bearings on the sun or stars. For this purpose the Microptic Transit is quite suitable for the order of accuracy required.

The instrument has undergone a lengthy period of development and test and has been found to give an accuracy of 1 minute of arc when compared with such laboratory instruments as the Kew magnetometer. It is, of course, necessary to test every component part of the instrument most carefully to make sure that there are no permanent or induced magnetic effects, for the effect of these cannot be systematically eliminated, although reversal of the compass and its offset from the vertical axis of rotation help to eliminate the effects due to slight magnetic contamination as the effect varies between compass left and compass right positions. Taking a mean reading, therefore, tends to reduce the effect of any contamination. Each instrument is, in fact, approved by comparison with a Kew type magnetometer.

Meeting of Permanent Committee of F. I. G.

The Permanent Committee of the Federation Internationale des Geometres held its annual meeting June 8–14, 1961 at Bern Switzerland. As a fully participating member of the F.I.G., the ACSM was represented by four delegates and the other U. S. National group (American Institute of Real Estate Appraisers) by two. There were a total of 72 delegates from the respective national surveying societies of 17 nations; Austria, Belgium, Bulgaria, Czechoslovakia, Denmark, France, Germany, Hungary, Italy, Luxembourg, Morocco, Netherlands, Poland, Switzerland, United Kingdom, United States, and Yugoslavia. Only five nations; Argentina, Finland, Israel, Liberia, and Sweden; were not represented.

In his opening remarks, F.I.G. Acting President G. Hollhuber especially welcomed the ACSM delegates, President B. Austin Barry, Past President George C. Bestor, Arthur F. Stryker of the USGS, and Granville K. Emminizer of the USC&GS. He expressed the hope that many "geometres" from the United States would come to Vienna for the Tenth International Congress, the first in which the ACSM would be participating as a member of the F.I.G. Lengthy daily meetings of the delegates expedited the formal Federation business, conducted in German, French, and English. Intersession contacts were frequent and profitable, with a genuinely cordial atmosphere pervading the meetings. The Saturday afternoon and the Sunday excursions by bus, train, and boat afforded opportunity for further friendly chats, meetings with regional surveying organizations, and vistas of Switzerland's incomparable scenery.

The main business of the meeting was planning the technical activities for the Tenth International Congress in Vienna, August 29 to September 6, 1962. Such work is divided among seven commissions, with each national body, through it appointed representatives, reporting to the commissions. The ACSM's Chairman Bestor has appointed the following to his F.I.G. Committee, these men serving thus as members of the several international commissions:

Comm. I (Technical Dictionary)—Ralph Moore Berry
Comm. II (Cadastre, Rural Reallotment)—W. B. Williams
Comm. III (Instruments, Methods, Photogrammetry, Geodesy, Cartography)—Shirley V. Griffith
Comm. IV (City Planning, Urban Redevelopment)—Murray Y. Poling
Comm. V (Junior Surveyors)—C. J. Aggeler
Comm. VI (Professional Status, Emoluments)—James L. Bell
Comm. VII (Education)—B. Austin Barry

Each of these men has been directed to prepare a national report for submission to his Commission Chairman by early 1962 to provide opportunity for translation, printing, and distribution prior to its discussion at Vienna. These reports will necessitate provocative and beneficial self-analysis by the ACSM in the areas of professional status, technical excellence, and education. They will also be previewed at the March 1962 Annual Meeting in Washington for the information of all.

Through constant interchange within the seven Commissions, through the annual meetings of the Permanent Committee, and particularly through the quintennial International Congresses, the ACSM should remain in close contact with men of stature in the surveying-mapping ("geometronics") spectrum of every nation and reap a harvest of benefit, if only through the incentive afforded.

At this Bern meeting, Dipl. Ing. K. Neumaier of Vienna was elected President of the F.I.G., to replace the late Dipl. Ing. Dr. Franz Schiffmann who died last January. The new president, President des Bundesamtes für Eich- und Vermessungswesen, together with Vice President Hollhuber, Secretaries A. Barvir and O. Stoier, and Treasurer W. Kamenick all of Austria form the nucleus for the preparation of the 10th Congress. In subsequent years, control will shift to the other national groups in anticipation of successive congresses held in those countries.

Other actions at Bern included final preparation of the multilingual dictionary for printing (by June 1962), admission of the Morocco Society of Geometres, tentative approval of the admission of the Canadian Institute of Surveying (successfully urged by the ACSM delegation), study of the impending free interchange of surveyors-mappers among the six European Economic Community (Common Market) nations, and approval of the Permanent Committee Meeting for Washington, D. C., in early September 1963. Much thought was given to the interrelation of scientific and professional advancement with the betterment of educational preparation in the technical field, a matter that must vitally concern the ACSM in the years ahead.

—Brother B. Austin Barry

The County Atlas of the United States*

By NORMAN J. W. THROWER

UNIVERSITY OF CALIFORNIA, LOS ANGELES

THE privately-produced county atlas is an American phenomen. Since the appearance of the first of these volumes about a century ago, well over four thousand different atlases and plat books of United States counties have been published by private companies and individuals. County atlases and plat books are considered together in this study since there are essential similarities between these two cartographic products; the terms are used interchangeably by some publishers. The core of both the county atlas and the county plat book usually consists of cadastral maps of each civil township in a particular county. Roads and railroads in addition to property lines, the names of property owners and areas of individual land holdings commonly appear on the maps. Although this is usually the basic information contained in county atlases and plat books, depending upon the publisher and the date of publication, there is a great deal of variation in the format. Some of these atlases are handsomely bound and contain engraved maps and township plats, considerable textual material, and lithographic illustrations. At the other end of the scale county atlases or plat books may consist of a series of blueprint copies of plats, or simply street plans in urban areas, between simple paper covers. Some county atlases were hastily compiled with the object of realizing a quick profit for the publisher, while others are very accurate and reliable records.

A number of atlases of United States counties have been published by Federal and local government agencies. Although such atlases account for considerable cadastral map coverage in a few States, they do not form a large component of the total United States county atlas output. Such government-sponsored atlases are not considered in this article, nor are official or unofficial cadastral maps and atlases of minor civil divisions, which are often the most important source materials used by the compilers of privately produced county atlases and plat books. Only atlases which cover all or a large part of any particular United States county and which have been compiled, printed, and published by private enterprise are included. Emphasis is placed on the earlier county atlas, which is described in greater detail than the more familiar plat book.

DEVELOPMENT

Individual map sheets of regions, States, and localities were published in America in colonial times. The production of general atlases in the United States, which dates from the last years of the eighteenth century, increased notably in the nineteenth century, when the State atlas was introduced. During the first half of the last century a steadily growing number of cadastral maps of townships were made of the more populous areas of the North Atlantic States. At first, such maps were usually hand drawn originals commissioned by township officials. Boundaries, survey lines, roads, and prominent physical feasures, particularly streams, are delineated on such maps. The perambulator-type odometer and the magnetic compass were the principal surveying instruments used for the field work which preceded compilation and drafting.

A demand among local landowners for these township maps led to production of engraved editions. By the middle of the last century privately-published cadastral maps, not only of townships, but also of entire counties, were fairly common. Since these county maps were often drawn on a

* Reprinted by permission from The *California Geographer*, Annual Publication of the California Council of Geography Teachers. 1960.

scale of one inch to one mile or larger, they were cumbersome and easily damaged. The introduction of the county atlas, which is characteristically a volume of township plats, was an answer to problems of size, storage, and preservation.

Although the first United States county maps and atlases were produced in the Middle and North Atlantic States, especially Pennsylvania and New York, and depicted counties in those States, it is in the Middle West that the private county map and atlas business has had its greatest success. Following the Civil War a number of ex-army

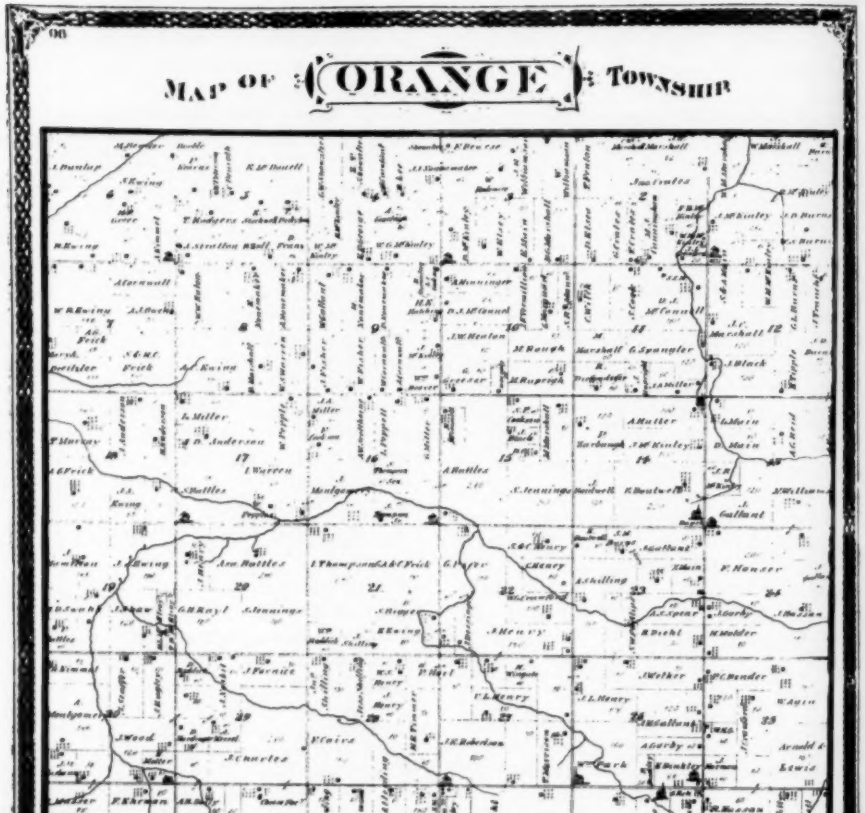


FIGURE 1.—Township plat from "Atlas of Union County," (Ohio) by A. S. Mowry, published in Philadelphia in 1877. This map, the original of which is on a scale of approximately 2 inches to the mile and occupies one page in the atlas, is a representative example of county atlas cartography.

officers saw the commercial possibilities of producing cadastral atlases of the prosperous agricultural counties of this more recently settled region.

Preparation of cadastral maps of the prevailing plains-like Midwest proved to be a simpler operation than it was in the counties of the Northeast, where local relief and slope are commonly greater. Moreover, the basic method of land subdivision used in the Atlantic States is the unsystematic metes and bounds survey. In this type of cadastral survey boundary lines, which are often ill-defined, extend in any and all directions. Property mapping is admittedly more difficult in areas subdivided in this manner than in the Middle West, where the systematic, rectangular method of the United States Land System was employed. Under this survey regularly-spaced lines oriented in cardinal directions enclose the well-known, mile-square sections. Most of the farm holdings are simple proportions of the section, with boundaries commonly parallel to the fundamental survey lines. (Figure 1)

A description of methods used in the county atlas business in the formative period is contained in a contemporary account by a critic of these methods, Bates Harrington.[1] According to this observer, the county atlas business grew out of earlier township and county map enterprises. County maps which were often financed on a subscription basis sold for about five dollars each in the mid-nineteenth century. The earliest examples are rather simple but later ones are frequently adorned around the edges with pictures of the establishments of prominent citizens. For the privilege of having such a picture on the map, the landowner would pay approximately thirty dollars. This proved to be a lucrative proposition to map publishers who wished to increase their incomes with additional pictures. However, there is a limit to the number of illustrations that can be conveniently placed around a map. An atlas enabled the publisher to increase greatly the amount of space available for pictures and maps and also permitted the introduction of pages of text.

County atlases, like the earlier county maps, were usually produced on a subscription basis. An agent of the atlas company would go to a county to attempt to interest the wealthiest and most influential men in the atlas project. He would interview local officials, lawyers, businessmen—especially realtors—as well as large landowners. Sometimes the canvasser succeeded in obtaining official sponsorship of the county board of supervisors and often a notice of the projected atlas would appear in the local newspaper together with a list of the sponsors. Canvassers would then go into the rural areas to sell subscriptions to farmers. Each subscriber was required to sign a contract for the atlas, delivery being promised for several months later. A list of all the subscribers appears in many county atlases. The usual price for a single atlas subscription in the late nineteenth century was approximately ten dollars.

Another agent of the publishing company would contact the wealthier men of the county relative to having pictures of themselves, their families, or their property included in the atlas. If an individual was agreeable to this proposal, he was required to sign a contract and later an artist would call to make sketches under the patron's direction. Such sketches were the basis for the illustrations which appear in large numbers in some of the atlases. The cost of such a picture was usually not less than fifty dollars and might be several times this figure, depending upon the subject and the amount of space occupied. (Figure 2)

Biographies of local persons are a feature of many of the atlases. Yet another agent of the publisher would be sent to the prospective client to discuss the matter of a biography. If the canvasser succeeded in selling this service another contract was signed, after which the agent would read a list of form questions to the patron and his family. From the responses to these questions an account of the life of the individual was composed. The price for a biography

[1] B. Harrington, "How 'tis Done: A Thorough Ventilation of Numerous Schemes Conducted by Wandering Canvassers." (Chicago, 1879). Although this interesting book gives a biased view of some aspects of the atlas business, it is one of the few contemporary accounts of the industry.

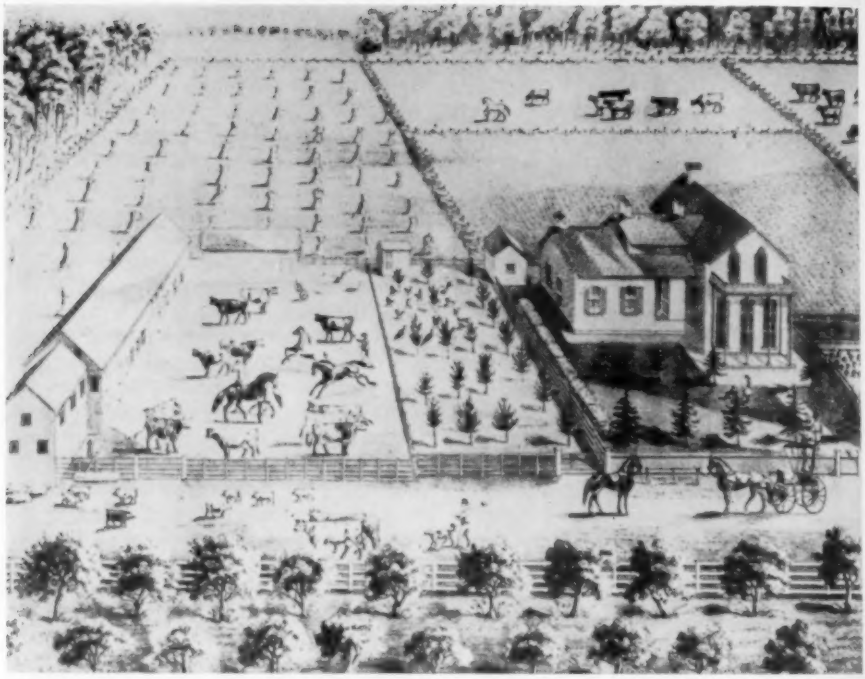


FIGURE 2.—A lighographic illustration from "Illustrated Atlas of Hancock County, Ohio," by G. A. Eberhart, published in Chicago in 1875. Views of this kind, although of little artistic merit, provide valuable information on the contemporary rural landscape.

was usually two and a half cents a word, with a minimum of ten dollars. Techniques employed in the county atlas business were well-tried methods of salesmanship: the product was identified with established institutions, the client committed himself a little at a time, and payment was deferred.

The amount realized from the sale of a county atlas in the eighteen seventies appears to have averaged about twenty-five thousand dollars per edition.[2] The total cost to the publisher was often about half this figure, while the remainder was clear profit. In view of this it is not surprising that substantial fortunes were amassed by some publishers. Usually the production of the original maps was one of the least considerable expenses, amounting to only a few hundred dollars per atlas. Information on property boundaries, size of properties, and ownership was either copied from official cadastral maps or compiled from tax lists and other records. When a draft of a civil division had been prepared by the agent of an atlas company, he would drive around the township in a buggy to add other information to the map. He would sketch in features such as roads, railroads, houses, farmsteads, churches, schools, blacksmiths' shops, orchards, timber lands, quarries, coal lands, etc. Detailed information on springs and wells derived from personal interviews with local residents, but the field work for the entire township might take only a few days. The major expenditures in the county atlas business were in printing, bind-

[2] Ibid. pp. 74 and 75. The estimated sales of fourteen county atlases sold in fourteen different Illinois county averaged approximately $25,000 but ranged from $17,000 to $38,000 per edition. The atlases in question, which are all dated between 1870 and 1876, include the work of several different publishers.

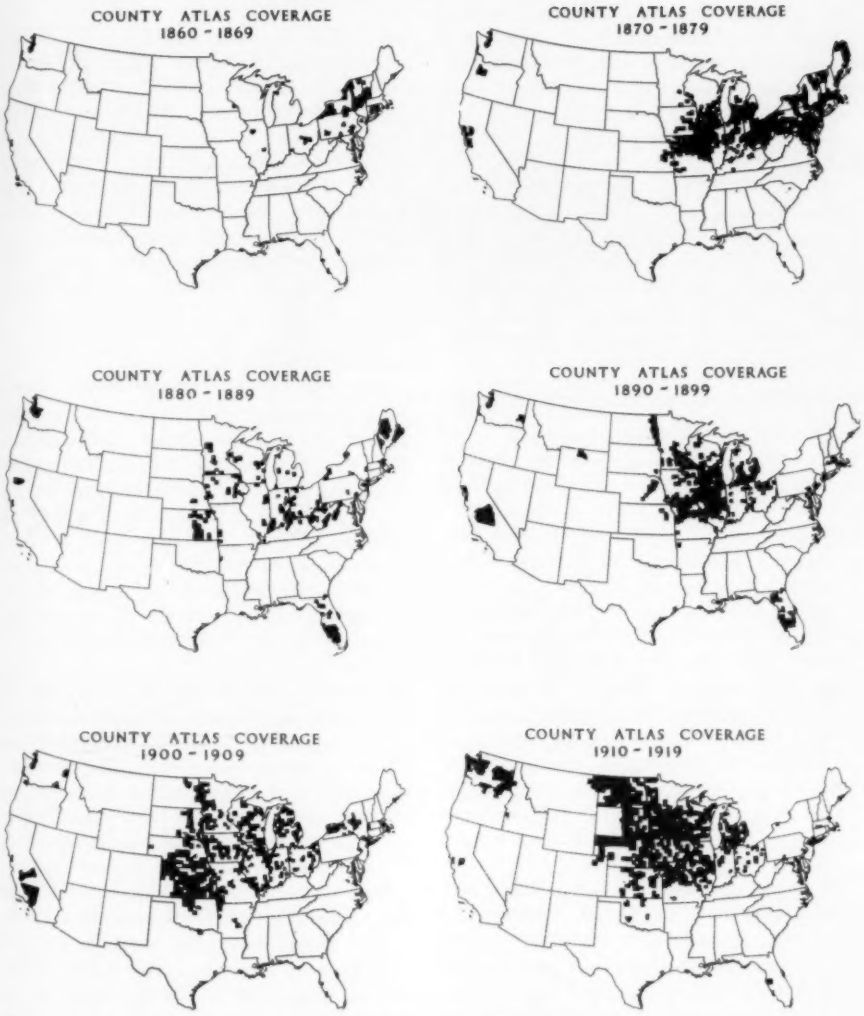


FIGURE 3.—The dark areas on the maps indicate the coverage of privately-produced county atlases and plat books between the given dates only. Atlases not positively dated are excluded.

ing, and selling the product, not in compiling the data.

The publishers of county atlases concentrated their efforts on counties considered to have sufficient numbers of landowners to support this kind of enterprise. A predominantly rural county with a population in excess of ten thousand persons was regarded by atlas publishers as a good prospect. In a county with a population of twenty thousand, an average of one thousand atlases might be sold. While many landowners refused to subscribe to the work, others would buy several copies. There is a record of one patron who purchased nineteen copies of an atlas for a total of one hundred and seven-

teen dollars. The same individual ordered a page view of his establishment at a cost of one hundred and sixty dollars and also contracted for a portrait and biography at three hundred and sixty-five dollars, making a grand total of six hundred and forty-two dollars.[3]

The most elaborate and expensive county atlases contain maps of the world and of various States. They also include short historical accounts of the development of the United States, of the county, and of each township in the county, in addition to the usual maps, biographies, illustrations, and subscription lists.

COVERAGE AND PLACE OF PUBLICATION

Over two hundred cities and towns in the United States can claim to be the place of publication of at least one county atlas or plat book. However, most of these atlases have been produced in a few centers by a comparatively modest number of publishing houses.

Apparently the earliest United States county atlases were of certain counties in Pennsylvania and were published in Philadelphia in the early 1860's.[4] Toward the end of this decade New York City became, briefly, the leading publishing center for county atlases. During the period 1860 to 1869 atlases appeared of a number of counties in New York State and New England as well as Pennsylvania and also a few scattered areas in the Middle West. (Figure 3).

In the next decade, 1870 to 1879, Philadelphia assumed undisputed leadership as the place of publication of county atlases with Chicago and New York as the next most important centers. At this period atlases were produced for numbers of counties in the Atlantic States north of Washington, D. C., particularly those counties not covered in the previous decade. The Middle West became the most important market for the commercial county atlas at this time. Most Ohio counties could boast of having an atlas by 1879, but no great publishing center developed in the State. Ohio county atlases of the time were produced mainly in Philadelphia, and later, in Chicago. Other significant publishing centers for county atlases at this period include Davenport, Iowa; St. Louis, Missouri; and San Francisco. Almost all the atlases produced in the last-named city were of counties in central California.

During most years of the 1880's county atlas production in Philadelphia exceeded that of Chicago, the second ranking center. New York City declined markedly as a place of publication for these volumes during the decade, while Minneapolis became increasingly significant. There appears to have been a temporary decline in the total number of atlases produced during the decade, but again the Middle West was the leading market area. An expansion took place into regions peripheral to the area covered in the previous decade. Atlases were prepared covering a considerable number of counties is Kansas, West Virginia, Kentucky, and Maine. During the decade several counties in Florida were mapped; but most of the county atlases for this State, produced in the 1880's and 1890's were published by a railroad company in Buffalo, New York.

After 1890 the Middle West became more emphatically the principal market area for county atlases than it had been in the preceding two decades. (Figure 4). Chicago, at the time, was clearly the leading place of publication of the county atlas. During the decade 1890 to 1899 about twice as many atlases were published in Chicago as in Philadelphia, the next most important center. The third center, in terms of the number of atlases published at this period, was the Twin City area of Minneapolis and Saint Paul.

These trends continued in the first decade of the present century, when approximately half of all the county atlases published in the United States originated in Chicago.

[3] Ibid. p. 93.

[4] C. Le Gear, "United States Atlases, A list of National, State, County, City and Regional Atlases in the Library of Congress," (Washington 1950), p. III, and C. Le Gear, "United States Atlases, A Catalog of National, State, County and Regional Atlases in the Library of Congress and Cooperating Libraries," volume 2 (Washington, 1953), p. III. These volumes were principal source materials used for the compilation of maps, Figures 3 and 4 of this study.

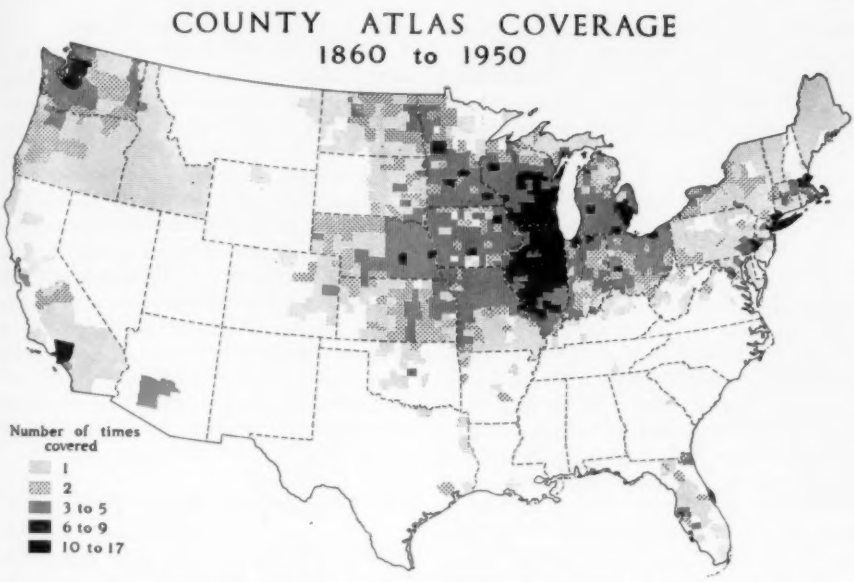


FIGURE 4.—The symbols indicate the extent and frequency of coverage by privately-produced county atlases and plat books, both dated and undated. Post-1950 coverage is concentrated mainly in areas previously covered, particularly counties in Iowa and Minnesota.

The second most significant center at this time was the Minneapolis-St. Paul area. Philadelphia, following the example of New York City, dwindled in importance. Only half as many county atlases were published in this eastern city, during the decade 1900 to 1909 as were produced in the Twin Cities. County atlases originating from big and small Middle Western centers accounted for considerable map coverage, particularly in the Great Lakes region and the central Great Plains.

Chicago maintained its position as the leading center of publication for county atlases during the next decade, 1910 to 1919, but it was seriously challenged by another northern Illinois city, Rockford. Philadelphia and New York were eclipsed by Minneapolis and Saint Paul and also by certain Iowa centers, especially Mason City and Des Moines. The publishers of county atlases and plat books were particularly active developing a market in the Dakotas, Nebraska, Kansas, and Minnesota. Some counties in the heart of the Corn Belt were being canvassed for the third or fourth time. After the appearance of a particular county atlas it was usual for publishers to wait from five to ten years before covering the territory again.

About the time of World War I the elaborate county atlas gave way to the simpler and less expensive plat book. At this period a number of industries and enterprises moved from Chicago into the Rock River Valley. This shift is evident in the county atlas and plat book business. The center of plat book publication in the United States at present is Rockford, Illinois; and several firms have their headquarters in this city. Unfortunately, the date of publication is not given on the plat books produced by some of the largest publishers, which makes these documents much less valuable than they would be if dated. Modern plat books may cost as little as one dollar, and it is not usual for them to be produced on a subscription basis. The present-day plat book consists, typically, of a paperbound volume of township maps. On these maps the

names of landowners, sizes of properties, and the limits of land holdings are indicated; towns, roads, and also streams are shown. Characteristically, a county index map is included and, quite frequently, a photograph of the county courthouse appears on the cover. However, modern plat books usually lack much of the cultural data which makes older county atlases such interesting documents.

The total coverage of commercially-produced county atlases and plat books from 1860 to 1950 is shown approximately in Figure 4. The number of times particular areas have been covered by different county atlases or separate editions of the same atlas is indicated by shading. Perhaps the most striking feature of the map is the general paucity of county atlas coverage in the rural South. Because of the Civil War and its aftermath it is understandable why there would be no great demand for county atlases in the Southern States in the 1860's and 70's. The fact that a market did not develop later is perhaps a reflection of the generally lower level of prosperity in the region and the lack of sufficient numbers of independent landowners who would be likely to purchase county atlases or plat books. The Middle West has been, unquestionably, the greatest market for these volumes as well as the major producing area. County atlas publishing expanded notably in the Pacific Northwest in the 1920's and 30's, with Portland, Oregon, and Tacoma, Washington, as the principal publishing centers. Most of the atlases covering counties in the States of the Northwest originated from these cities or other less important centers in the region. Since the early part of this century there has not, apparently, been a great market for county atlases in the rural areas of the North Atlantic States. However, in that region, and in some other areas, property and street atlases covering the whole or large portions of predominantly urbanized counties have been produced commercially. The county atlas coverage of southern California is of this type.

County atlas and plat book production has fluctuated considerably from year to year and from period to period. Only about half as many county atlases appeared in the 1880's as were published in the previous decade, or in the succeeding one. Since 1890 at least three hundred county atlases or plat books have been published in every decade, and for some decades the total number is about twice this figure. During the years of World War I there was a slight decline in production and a profound one during the depression years of the 1930's. This lower production continued during the period of World War II, but after 1945 the number of plat books published increased greatly. Approximately one hundred new plat books have appeared annually from the mid-1940's to the present time.

UTILITY OF COUNTY ATLASES AND PLAT BOOKS

The value of privately-produced county atlases and plat books is recognized by county surveyors, who are responsible for official cadastral mapping. This official coverage is usually in the form of original maps of individual townships in the county, which are amended as property changes occur. Because there is often no provision for copies of these master maps to be deposited in county archives at specified intervals, official cartographic coverage provides a record only of current cadastral patterns. County surveyors will supply copies of their maps to the public, but some of these officials find it convenient to sell the latest commercially-produced plat books when cadastral map coverage is requested. Lawyers frequently refer to county atlases and plat books to establish facts of land ownership, the atlases being often the best and sometimes the only record available. These privately-produced atlases are also consulted by county tax officers.

Teachers in the social sciences find county atlases valuable documents for instruction in local geography, history, and government. Although many of these volumes are privately owned, copies may be found in courthouses and public libraries, and some historical societies collect county atlases assiduously.

To geographers in general and to historical geographers in particular the county atlas and plat book offers a wealth of useable information. A single atlas usually provides uniform and detailed map coverage of a county unit at a given date. Occasionally, large blocks of counties were mapped in essentially the same fashion by one concern, in a short space of time. The township plats in the atlases make possible the reconstruction of features of earlier landscapes such as road patterns and property boundaries. In a county courthouse in rural Ohio the writer saw a map compiled by a superintendent of schools showing the distribution of early one-room schoolhouses in a particular area. The information was supplied largely from county atlases. It would have been very difficult, if not impossible, to have constructed the map without this source material.

If an area has been covered by county atlases at different dates, interesting and useful comparisons can be made respecting changes in the landscape. Other source materials may provide essentially the same information but more often the data are unavailable or at best scattered. The maps contained in the atlases have survived by virtue of the fact that they are bound in volumes; while separate sheet maps, which are more difficult to preserve have, in many cases, perished. This includes maps on which the atlas coverage itself is based. Historical geographical studies may be greatly facilitated by the use of county atlases which are convenient, but sometimes neglected, sources of information.

The privately-produced county atlas of the United States has been regarded as a rather inelegant monument to the vanity of man. Perhaps it may be considered, with more justice, as a rugged tribute to agricultural America and to the economic system of which it is a product.

PRE-CONVENTION JOURNAL
Advertising Tie-in Opportunity

The next combined Annual Meetings of the American Congress on Surveying and Mapping and the American Society of Photogrammetry will be held March 11-17, 1962.

Use the October-December issue of SURVEYING and MAPPING to tie in with the forthcoming convention by advertising your products and exhibits in this important issue.

DEADLINE: October 15, 1961
Prepare for advertising now

Advertising Department — SURVEYING and MAPPING
1028 Connecticut Avenue, N.W., Washington 6, D.C.

Surveying and Mapping Literature

Members are requested to send in surveying and mapping news items for publication in SURVEYING AND MAPPING. —EDITOR

MAGAZINE ARTICLES

General Interest

HYDROGRAPHIC SURVEYING IN AUSTRALIAN WATERS. Commander S. R. Schofield, Hydrographer, Royal Australian Navy. *The Australian Surveyor,* Vol. 18, No. 3, December 1960. (Historical review of activities begining with work of Captain James Cook in 1770.)

MEKONG RIVER SURVEY. R. A. Brocklebank. *The Canadian Surveyor,* Vol. 15, No. 7, March 1961. (Detailed account of project coordinated by Hunting Survey Corporation Limited of Canada.)

THE INFLUENCE OF COMPUTERS ON ENGINEERING EDUCATION. Charles D. Holland. *Texas Engineering Experiment Station News,* Vol. 12, No. 1, March 1961. (Describes function of electronic computers in effort to make increasingly complex technology as simplified as possible.)

GEOLOGY AND GEOLOGISTS IN FICTION. Mark W. Pangborn, Jr. *Journal of the Washington Academy of Sciences,* Vol. 51, No. 4 April 1961. (Amusing summary of works of fiction which include characters who are geologists or in which geology is a component of the plot.)

SURVEYING—ITS CURRENT STATUS IN CIVIL ENGINEERING. Earle J. Fennell. *Civil Engineering,* Vol. 31, No. 4, April 1961. (Discussion of relationships of land, engineering, geodetic, and cartographic surveying.)

SINKING LAND. *Our Public Lands,* Vol. 10, No. 4, April 1961. (Describes study of sinking land phenomena with especial reference to California's San Joaquin and Santa Clara valleys and the Wilmington Oil Field.)

DECIMAL SYSTEM, YES, METRIC SYSTEM, NO. Bernard L. Weiner. *Civil Engineering,* Vol. 31, No. 6, June 1961. (Opposes adoption of metric system for weights and measures.)

A NEW "MISSISSIPPI" FOR THE U.S. ENGINEER CORPS. *Marine News,* Vol. 47, No. 12, June 1961. (Specifications of new towboat under construction for general service and also for annual inspection of the river by Mississippi River Commission.)

Control Surveys

A GEOID AND WORLD GEODETIC SYSTEM BASED ON A COMBINATION OF GRAVIMETRIC, ASTROGEODETIC, AND SATELLITE DATA. W. M. Kaula. *Journal Geophysical Research,* Vol. 66, No. 6, June 1961. (Gives formula obtained from a worldwide estimate of the gravity field combined with an estimate of the geoid and with variations in satellite orbits in least-squares adjustment which was generalized by taking correlation into account.)

BLOCK ADJUSTMENT—DEVELOPMENTS AND EXPERIMENTS. S. G. Bervoets. *Cartography,* Vol. 3, No. 3, March 1960. (Part I. Further Thoughts of Analytical Adjustment Including Analysis of Results.)

THE INFLUENCE OF MODERN ERROR THEORY ON THE RECONNAISSANCE AND ADJUSTMENT OF TRAVERSES. P. Richardus. *Cartography,* Vol. 3, No. 3, March 1960. (Mathematical demonstration.)

THE TELLUROMETER IN GEODETIC SURVEYING. C. David McLellan. *The Canadian Surveyor,* Vol. 15, No. 7, March 1961. (Evaluation of Tellurometer performance on basis of three years experience.)

A METHOD OF BLOCK ADJUSTMENT FOR HORIZONTAL COORDINATES. G. H. Schut. *The Canadian Surveyor,* Vol. 15, No. 7, March 1961. (Describes methods and computations devised by the National Research Council of Canada.)

SOME EXPERIMENTS ON BEACON MOVEMENT IN THE ORANGE FREE STATE. S. T. Baron. *The Journal of the Institute of Mine Surveyors of South Africa,* Vol. 11, No. 5, March 1961. (Describes experimental observations to detect movement of survey markers in heaving clay soils.)

THE REFORMATION OF GEODESY. R. A. Hirvonen. *Journal of Geophysical Research,* Vol. 66, No. 5, May 1961. (Expresses three new ideas which tend to change the traditional principles of geodesy.)

Education

PROFESSIONAL PRACTICE. Alan J. Brown. *The Australian Surveyor,* Vol. 13, No. 3, December 1960. (Discusses some aspects of private practice in which the surveyor receives little or no formal training, and suggests some ways in which suitable training could be attempted.)

THE SURVEY ENGINEERING COURSE. Dr. G. Konecny. *The Canadian Surveyor,* Vol. 15, No. 7, March 1961. (Outlines program of survey engineering education at the University of New Brunswick.)

Instruments

THE NEW LOOK IN STADIA. D. H. Richardson. *The Canadian Surveyor,* Vol. 15, No. 7, March 1961. (Describes experiment with new type of stadia instrument developed in Europe and known as "Auto-Reduction Tacheometer.")

UNI-AXIAL PANTOGRAPH. J. C. Barnes. *Journal of Scientific Instruments,* Vol. 38, No. 3, March 1961. (Description of a simple and effective drafting instrument for changing the scale of a graphical trace along one axis only, leaving the other axis unaltered.)

Property Surveys

"NEW LOOK" FOR THE TORRENS SYSTEM. B. Davies, Esq. *The Australian Surveyor,* Vol. 18, No. 3, December 1960. (Outlines proposals for modernizing the system for declaring land titles and facilitating transfers.)

SUBDIVISIONAL PROBLEMS. F. E. Culliver. *The Australian Surveyor,* Vol. 18, No. 5, March 1961. (Discussion of problems of the land surveyor in laying out vacant lands.)

ROADS IN URBAN SUBDIVISIONS. R. B. Alderton. *The Australian Surveyor,* Vol. 18, No. 5, March 1961. (Discusses role of surveyor in planning and construction of roads in suburban areas.)

SHEEP MOUNTAIN CADASTRAL SURVEY. Frank K. Van Zandt. *The Military Engineer,* Vol. 53, No. 353, May–June 1961. (Describes use of photogrammetry in surveying over difficult terrain in Alaska.)

BOOKS AND PAMPHLETS

ELECTRONIC SURVEYING AND MAPPING. Simo Laurila. Ohio State University, Columbus. Institute of Geodesy, Photogrammentry and Cartography, Publication No. 11. Columbus 1960 294 pp.

UNIVERSAL TRANSVERSE MERCATOR GRID; TABLE OF GEOGRAPHIC COORDINATES FOR 10,000-METER U. T. M. GRID INTERSECTIONS, INTERNATIONAL SPHEROID. U. S. Hydrographic Office, Washington, 1960. (H. O. SP–40) 313 pp.

NEW YORK, REGISTERED PROFESSIONAL ENGINEERS AND LAND SURVEYORS AND CORPORATIONS REGISTERED FOR THE PRACTICE OF PROFESSIONAL ENGINEERING AND LAND SURVEYING, APRIL 15, 1959, to MARCH 1, 1960. University of the State of New York Bulletin No. 1465. Albany. 53 pp.

LOUISIANA, YEAR BOOK OF REGISTERED PROFESSIONAL ENGINEERS AND LAND SURVEYORS, 1961. State Board of Registration for Professional Engineers and Land Surveyors. New Orleans. 144 pp.

MEASUREMENTS FOR ENGINEERING. Michael V. Smirnoff. *Prentice-Hall, Inc.,* Englewood Cliffs, New Jersey. 1961. 556 pp. $9.75.

BAROMETER RISING: REVIEW OF THE ONTARIO DEPARTMENT OF MINES, 1960. Toronto, February 1961. vii + 120 pp., illus., maps.

THE MAP COLLECTION IN A GENERAL LIBRARY: A MANUAL FOR CLASSIFICATION AND PROCESSING PROCEDURES. Thomas A. Smith. The University of Kansas. Lawrence, 1961. 126 pp.

DISTRICT OF COLUMBIA, BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS, ROSTER, 1960. Washington (1961?) 102 pp.

EFFECTIVENESS OF THE ARMY MAP SERVICE MAP DEPOSITORY PROGRAM AND METHODS FOR PROMOTING MAP USE. Marvin W. Sears. Washington, 1960. 46 pp. (Unpublished Master's thesis. Microfilm available at Catholic University, Washington, D. C.)

—LYMAN D. LYNN

Coast and Geodetic Survey

IT IS NOT TOO EARLY TO BEGIN PLANNING
TO ATTEND THE 1962 MEETINGS
SHOREHAM HOTEL, WASHINGTON, D. C., MARCH 11–17 1962

PUBLISHING ADDRESSES

The following is a list of the publishing addresses of Journals and serial publications referred to frequently in the "Surveying and Mapping Literature" department of SURVEYING AND MAPPING. It is intended as a service to readers who wish to arrive at the source of material referred to in that department. Information on the availability of back copies or reprints of specific articles may usually be obtained from these addresses. Foreign language publications have been omitted.

Efforts will be made to keep this list up to date and it may be reprinted at intervals. The list is arranged by geographical areas for your convenience.

AUSTRALIA

The Australian Surveyor, Institution of Surveyors, Science House, 157 Gloucester Street, Sydney, New South Wales, Australia.

Cartography, The Australian Institute of Cartographers, Box 1028 GPO, Elizabeth Street, Melbourne, Victoria, Australia.

CANADA

The Canadian Surveyor, Canadian Institute of Surveying, P. O. Box 3151, Postal Station C, Ottawa, Ontario, Canada.

The Nova Scotian Surveyor, Association of Provincial Land Surveyors, Inc., P. O. Box 1541, Halifax, Nova Scotia, Canada.

GREAT BRITAIN

The Chartered Surveyor, Journal of the Royal Institution of Chartered Surveyors, 12 Great George Street, Parliament Square, Westminster SW 1, London, England.

Empire Survey Review, 4 Millbank, London SW 1, England.

Endeavor, Imperial Chemistry Industries, Ltd., Millbank SW 1, London, England.

Journal of Scientific Instruments, 1 Lowther Gardens, Prince Consort Road, London SW 11, England.

NEW ZEALAND

The New Zealand Draughtsman, New Zealand Institute of Draughtsmen, Inc., Box 598, Wellington, New Zealand.

New Zealand Geographer, University of Auckland, Auckland, New Zealand.

New Zealand Surveyor, Journal of the New Zealand Institute of Surveyors, Box 2543, Wellington, New Zealand.

UNITED STATES

Bulletin Geodesique (bi-lingual), Journal of the International Association of Geodesy, Pergamon Press, Ltd., 4 & 5 Fitzroy Square, London W 1, England, *and* 122 East 55th Street, New York 22, N. Y.

California Highways and Public Works, P. O. Box 1499, Sacramento, California.

Civil Engineering, American Society of Civil Engineers, Headquarters: 33 West 39th Street, New York 18, N. Y.

The Draftsman, Official Publication of the Association of Professional Draftsmen, Sedan Publishing Company, 10600 Puritan, Detroit 38, Michigan.

Engineering News-Record, McGraw-Hill Company, 330 West 42nd Street, New York 36, N. Y.

Journal, Florida Engineering Society, 2517 East Colonial Drive, Orland, Florida.

Geographical Review, The American Geographical Society of New York, Broadway at 156th Street, New York 32, N. Y.

Journal of Geophysical Research, American Geophysical Union, 1515 Massachusetts Avenue, N.W., Washington 5, D. C.

Geo Times, American Geological Institute, 2101 Constitution Avenue, N.W., Washington 25, D. C.

The Military Engineer, Society of American Military Engineers, the Mills Building, Pennsylvania Avenue at 17th Street, N.W., Washington 6, D. C.

The National Geographic Magazine, National Geographic Society, 16th and M Streets, N.W., Washington 6, D. C.

Navigation, Journal of the Institute of Navigation, 711 14th Street, N.W., Washington 5, D. C.

North Carolina Engineer, North Carolina Society of Engineers, Box 10614, Raleigh, North Carolina.

Our Public Lands, Bureau of Land Management, U. S. Department of the Interior, Washington 25, D. C.

Scientific American, Scientific American, Inc., 415 Madison Avenue, New York 12, N. Y.

Special Libraries, Special Libraries Association, 31 East 10th Street, New York 3, N. Y.

SOUTH AFRICA

The South African Survey Journal, Central Council of Land Surveyors, Secretary, P. O. Box 3361, Johannesburg, South Africa.

The Journal of the Institute of Mine Surveyors of South Africa, P. O. Box 53, Krugersdorp, Transvaal, South Africa.

—LYMAN D. LYNN
Coast and Geodetic Survey

Distinctive Recent Maps

A large dot map showing *World Population* has been compiled by Dr. Alfred Söderlund of the Department of Geography, Stockholm School of Economics. At the scale of 1:16,000,000, the map is on Sanson's interrupted equal area projection. It is printed on three sheets each 51 by 35 inches in size. There are enlarged inset maps of western Europe, Egypt, northern India, southern India and Ceylon, eastern Asia, and Indonesia. Title and legend are in English, French, Swedish, Italian, Spanish, German, Russian, Chinese, and Arabic.

American Geographical Society Special Publication No. 34 is entitled *Nine Glacier Maps: Northwestern North America*. The maps, all of which are at the scale of 1:10,000, are folded in a slip case, along with a 39 page descriptive brochure. The price for the set is $3.00. Eight of the maps portray Alaskan glaciers, while sheet No. 2 shows Blue Glacier on Mt. Olympus in the State of Washington. The maps, which vary in size, were prepared under the sponsorship of the U. S. National Committee as part of the program for the International Geophysical Year 1957–58. Each sheet includes an index map locating the glacier portrayed, and ground control, aerial photography, and plotting data.

Bird Migration Map of North America is a colorful presentation of our migratory birds and their skyways across the continent. The large, main map shows the routes followed by whooping cranes, eagles, sand pipers, and some of the large game birds. Color paintings of the birds decorate the map. Fourteen small marginal maps outline the breeding areas and winter range, and trace the migration routes of a number of the song birds, which are also presented in colored illustrations. The map was compiled by Robert Hagey, Modern Educational Aids, P. O. Box 209, Wilmette, Ill., and published by Rand McNally and Company. Paintings are by Albert Gilbert. Marginal text includes an essay on "Why Birds Migrate" and a description of "Routes of Migration." The map sheet measures 42 by 33 inches.

E. A. Riggs, of the University of Illinois, is the compiler and publisher of a map showing *Major Basins and Structural Features of the United States*. The physical features are shown by diagrammatic sketches on a black-and-white base. The map, which was published in 1960, measures 27 by 39 inches and is at the scale of 1:5,000,000.

James Trumbull has compiled a new map showing *Coal Fields of the United States*, which was published by the U. S. Geological Survey in 1960. It is at the scale of 1:5,000,000 and the map sheet measures 36½ by 52 inches. Colors differentiate areas of (a) anthracite, semianthracite, and metaanthracite, (b) low-volatile bituminous coal, (c) medium and high-volatile bituminous coal, (d) subbituminous coal, (e) lignite and brown coal, and (f) coking coal. There are inset maps showing geologic age of coals of the United States, original coal reserves, cumulative coal production, and bituminous coal producing districts. A list of selected references is arranged by States.

A colorful pictorial map illustrates the exploration of Europeans in the American Southwest by the expedition of Vasquez de Coronado in 1540–42. The map, prepared by Don Perceval, was published in 1961 by Southwestern Monuments Association, Box 1562, Globe, Arizona. It measures 14½ by 25 inches, and is printed on a simulated-parchment paper. A descriptive booklet, by John P. Slack, accompanies the map.

Three sheets of the *New York and Vicinity* map have been released by the U. S. Geological Survey. Comprising part of its series of city and vicinity maps, the new sheets show, respectively, the environs of Paterson, Staten Island, and Hempstead. The maps, as others in the series, are at the scale of 1:24,000 and are composites combining four standard quadrangles. The sheets of the city and vicinity series measure 54 by 39 inches.

Geologic Map of Pennsylvania is a 1960 publication of the Topographic and Geologic Survey of the Commonwealth of Pennsylvania. It was compiled and edited by Carlyle Gray and V. C. Shepps. The map, which is at the scale of 1:250,000, shows formations ranging from Pre-Cambrian to Quaternary. It is printed on two sheets each of which measures 58 by 42 inches. There are four structural cross sections and an inset map giving sources of data for the different parts of the State.

The New Jersey Historical Society, Newark 4, N. J., has published a six-color facsimile edition of William Faden's *The Province of New Jersey Divided into East and West commonly called The Jerseys*. Originally published in December, 1778, the map incorporates corrections based on observations of British and Hessian engineers who participated in the New Jersey campaigns in the early months of the Revolutionary War. William Faden was one of the foremost London map and atlas publishers in the last quarter of the eighteenth century. The reproduction, which measures 31 by 22 inches, is printed, from engraved

plates, on hand-fashioned paper. The price is $7.50.

Map of Florida Industry and Science was copyrighted in 1961 by David Kuhner and published by Florida Space Publications, P. O. Box 11324, St. Petersburg 33, Florida. It shows industrial areas and parks, major commercial airports, principal deepwater ports, railroads, interstate highways and turnpikes, missile and satellite tracking stations, research and development laboratories, colleges and universities, and science museums or expositions. The map is 22 by 28 inches. No scale is given. Miscellaneous data and information are presented on the verso of the map sheet.

The Texas Agricultural Experiment Station, College Station, Texas, in cooperation with the U. S. Department of Agriculture, has published a small (1:6,250,000) map showing *Vegetational Areas of Texas*. The ten regions mapped are briefly described in the folder of which the map is a part. The map is 11 by 8½ inches in size.

The Arizona Bureau of Mines, Tucson, published in 1961 a *Map of Known Mineral Occurrences of Arizona*, at the scale of 1:1,000,000. The map, compiled by Fred J. McCrory and Robert T. O'Haire, locates deposits of 29 different minerals. It is 29 by 24 inches in size.

The U. S. Geological Survey published in 1961 a 1:24,000 contour *Map of Yosemite Valley*. Medium-duty, light-duty, and unimproved dirt roads are shown, as well as camp sites, lodges, and scenic attractions. There is a table giving "Elevations of principal points." The map sheet measures 19 by 42 inches.

Alaska Highway Map 1961 is the first official road map of our forty-ninth State. It is copyrighted by Rand McNally and Company, and is based on data supplied by the U. S. Geological Survey. The publisher is the Division of Highways, Box 1841, Juneau, Alaska. The map, which is at the approximate scale of 1:3,750,000, shows generalized relief by shading, and includes railroads and airports as well as trails and three classes of roads. There is an index of place names, a mileage chart, and a brief note on "Your Trip to Alaska" on the recto of the map sheet. On the verso is a map showing "Main Connecting Routes to Alaska," a description of the Alaskan Highway, and a selection of scenic photographs. The main map measures 23 by 22 inches.

Mapa Geologico do Brasil is a 1960 publication of Divisão de Geologia e Mineralogia of Brazil's Ministério da Agricultura. It is at the scale of 1:5,000,000, and measures 39 by 39 inches. The map was compiled under the direction of Alberto Ribeiro Lamego. Oceanic islands are shown on inset maps.

Two maps of the European Community have been compiled by I. B. F. Kormoss and published by the Institut Geographique Militare, Bruxelles, Belgium. Both are at the scale of 1:4,000,000 and measure 21 by 18 inches. Principal administrative divisions of the several member countries are outlined on *Carte Administrative des Pays Membres des Communautés Européennes*. Power resources are located on *Les Sources d'Energie des Pays Membres des Communautés Européenes de la Suisse et de L'Autriche Occidentale*.

Polska Mapa Geologiczna maps the distribution of geological formations in Poland, ranging in age from pre-Paleozoic to Pleistocene. The map is a 1960 publication of Panstwowe Przedsiebiorstwo Whdawnictw Kartograficznych, Warsaw. It was compiled by E. Rühle, St. Sokolowski, and M. Tyska. The map is at the scale of 1:700,000 and measures 46 by 46 inches.

Carta Magnetica D'Italia shows lines of equal magnetic force in Italy. It is a 1960 publication of the Division of Geodesy of the Istituto Geografico Militare, Firenze. The map measures 30 by 22 inches and is at the scale of 1:200,000.

Administrative divisions and the transportation system of Cambodia are shown on a recently received map entitled *Royaume du Cambodge, Carte Routiere & Administrative*. The map is 20 by 24 inches and is at the scale of 1:1,000,000. Generalized relief is shown by hypsometric tints. The map was published by the Service Geographique of Cambodia.

Carte Géologique du Department de Reunion, presents in detail the geology of the Indian Ocean island of Reunion. It is at the scale of 1:50,000 and is printed on four sheets two of which measure 28½ by 37 inches, and the other two are 28½ by 30 inches. The geologic data were compiled by Pierre Bussiere, of the Service Géologique de Madagascar, and the map was published, in 1960, by Carte Géologique de la France.

Distribution of the *Grass Cover of Africa* is shown on a 1960 map published by the Plant Production and Protection Division, Food and Agriculture Organization of the United Nations, Rome. The map, which was compiled by FAO Consultant J. M. Rattray, includes some 27 types of grass cover. The scale is 1:10,000,000 and the dimensions are 36 by 32 inches.

Geological Map of Ghana was compiled under the direction of D. A. Bates, Director of the Ghana Geological Survey. The map, originally published in 1955, was reprinted, in 1958, by the Survey of Ghana, Accra. The table of formations ranges from "intrusive rocks" to "Tertiary" and "Recent." The map is 33 by 24 inches and is at the scale of 1:1,000,000.

The Sudan Survey Department, Kartourn, published in 1960 maps of *Northern Gezira* and *Southern Gezira* showing "Location of Omodias." Data were derived from the first population census of the Sudan, in 1955–56. The maps measure 24 by 36 inches and are at the scale of 1:250,000.

—WALTER W. RISTOW

Library of Congress

The Surveyor and the Law

Questions concerning proper procedures to be followed in locating property boundaries will be answered to the best of our ability in this column. Contributions suitable for publication in this department—covering special legal problems or the results of court cases—are requested. Communications should be addressed to A. J. Wraight, Chairman, Publications Committee, ACSM, Coast and Geodetic Survey, Washington 25, D. C. —EDITOR

Tie Points

From a local surveyor I received a question concerning the status of tie points and what special value they have as evidence.

My answer is:

Public records are admissible in evidence; there is no trouble introducing evidence of tie point positions. Private records, on the other hand, cannot be introduced as evidence without the author being present (there are some exceptions).

Usually, but not always, the monuments and tie points set by the city engineer or the public surveyor, when performing official duties, are prima facie evidence. At law, prima facie evidence is taken as true until such time as it is proven false. Recorded deeds are prima facie evidence of the contents of writings. The original deed may be produced to refute the contents of the recorded document, but, until it is, the recorded deed is accepted.

Monuments and tie points set by city officials, especially if in connection with their official duties, are often accepted in court as being correct unless proven incorrect. This has advantages and much merit in some instances.

After all of the original monuments of an addition to a city have disappeared and uncertainty exists as to street and property locations, tie points by the city engineer are a welcome sight. And after these have been used a number of years, they become accepted as true. This is one of the methods of establishing boundaries and eventually this gives certainty to locations. Without tie points having prima facie status as evidence, many property lines could not be established without court action.

But tie pointing by the city engineer, improperly done, can cause great harm. In one city in the Imperial Valley the city engineer tie pointed all of the blocks by giving them exactly record measurements, and then placed all of the surplus and deficiency in the streets. Many instances of improper tie pointing are found in the court's records, as at Santa Barbara, Scaramento and Racine (Wis.). The usual objections to improperly set tie points come from surveyors with private records; they know when something is wrong. Prima facie status of evidence (tie points) does not always prevent troubles; but it does, at times, give definiteness to otherwise degenerated situations. Tie points, properly set, represent one of the best methods of giving stability to property location.

—CURTIS M. BROWN

Cartography Division Awards

The Cartography Division, ACSM, again offers two awards of $75.00 each, for the most outstanding papers on some timely phase of cartography. The purpose of the awards is to aid in the promotion of cartographic exposition in SURVEYING AND MAPPING. Entries must be submitted for publication during the period beginning August 1, 1961, and ending at the start of the 22nd Annual Meeting of ACSM in March 1962, at which time the awards will be presented. Members of the Executive Board of the Cartography Division will serve as judges to determine the winning articles.

Your article could win—send it in—NOW!

Books in Review

ENGINEERING DRAWING AND GEOMETRY (2nd Edition). Randolph P. Hoelscher and Clifford H. Springer. *John Wiley & Sons, Inc.*, New York, 1961. 628 pp., illus., $8.95.

This college text of drawing and descriptive geometry contains much material that this reviewer remembers scattered through many texts and courses in his undergraduate days. The authors appear to have achieved their objective of providing under one cover a textbook which, among other things, covers adequately the work of basic drawing courses, fundamental descriptive geometry, and fundamental work in graphic computations.

The book is divided into four parts which are entitled: Basic drawing, geometry of advanced projection systems, technical charts and graphic computation, and professional applications. Each part contains five or more chapters.

Map drawing is contained in a 24-page chapter, under professional applications. This chapter, like its companions, is very good. It should help the future mapmakers to get started, while the present ones could gain by the study of the other chapters.

—FRANK S. FARQUHAR

BOOK NOTES

LEGAL GUIDE FOR CALIFORNIA PROSPECTORS AND MINERS (Revised Edition, 1960). California Department of Natural Resources, Division of Mines, Ferry Building, San Francisco, California. Paper cover, 6×9, 128 pages, illustrated, $1.00.

This book contains some material which should be of interest to any of the readers of SURVEYING AND MAPPING who are operating in California and have occasion to do surveying in connection with mineral claims of any sort. This is the 12th edition of this publication, though the titles of previous editions have not all been the same. The 12th edition was extensively revised by Charles L. Gilmore.

EROSION AND SEDIMENTATION — EASTERN CHESAPEAKE BAY AT CHOPTANK RIVER. G. F. Jordan. Coast and Geodetic Survey Technical Bulletin No. 16, January 1961. Paper cover, 8×10, ii+8 pages, illustrated, plus large folded chart. Available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., at 40 cents per copy.

A documented study of topographic and hydrographic surveys covering a period of over 100 years and showing changes in shoreline and depths during that period.

PHOTOGRAMMETRIC RECTIFICATION. Topographic Instructions of the United States Geological Survey, Book 3, Chapter 3C3, 1961. Paper cover, 8×10, viii+42 pages, illustrated. Available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. Price 40 cents.

Instructions for preparing equivalent vertical prints from tilted aerial negatives; a discussion of the theory of rectification.

PLANE COORDINATE INTERSECTION TABLES (2½-MINUTE)—KANSAS. Coast and Geodetic Survey, Publication 65-1, Part 14, 8×10, paper cover, iv+124 pages. Available from Superintendent of Documents, Government Printing Office, Washington 25, D. C. $0.65.

PLANE COORDINATE INTERSECTION TABLES (2½-MINUTE)—MASSACHUSETTS. Coast and Geodetic Survey Publication 65-1, Part 19, 8×10, paper cover, iii+27 pages. Available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. at 25 cents per copy.

PLANE COORDINATE INTERSECTION TABLES (2½-MINUTE)—MICHIGAN. Coast and Geodetic Survey, Publication 65-1, Part 20, 8×10, paper cover, iv+187 pages. Available from Superintendent of Documents, Government Printing Office, Washington 25, D. C. $1.00.

The tables in these three publications contain the plane coordinates for 2½-minute intersections of meridians and parallels within the limits of the States. These plane coordinates are based on the State plane-coordinate systems established by the U. S. Coast and Geodetic Survey. The tables are arranged by 12½-minute bands of latitude with the full range of longitude of the Zone, followed by the coordinates for the next higher band of latitude. The tables are also arranged by Zone.

See SURVEYING AND MAPPING, September 1960, Vol. XX, No. 3, page 361, for more detail concerning this type of publication.

Abstracts of Articles on Geodesy and Related Fields

The Army Map Service, of the Corps of Engineers, U. S. Army, publishes quarterly a series of processed sheets under the title: "Abstracts of Articles on Geodesy and Related Fields." The following excerpts are from the issue bearing the date of April 1961 and are selected for reprinting in SURVEYING AND MAPPING as being of possible interest to a considerable percentage of our readers. The selection has been somewhat arbitrary, and only those abstracts believed to be of quite general interest have been included. —EDITOR

787 *Measurement of the Heerbrugg Base Line in 1959* (Die Basismessung von Heerbrugg 1959). Joseph Mitter

A treatise is presented concerning the purpose, arrangement and observations for the measurement of the base line and base expansion net of Heerbrugg in co-operation of geodetic institutes in Switzerland, Austria, West Germany, and the Wild Company in Heerbrugg.

Following the recommendations of the International Union for Geodesy and Geophysics (IUGG), on its 10th Congress in Rome in 1954, for the establishment of uniform fundamental geodetic data and recomputation of the European net, a critical review of the fundamental data of the "Central European Net" (ZEN) uncovered diversity of national net scales. This led to shifting the Munich base line to the Ebersberger Forst, about 30 km. east of Munich, and the establishment and measurement of a new base line in the valley of the Rhein south of Lake Constance (Bodensee) as a substitute for the unfavorable Hall (Tirol) base line. This new Heerbrugg base line derives its name from the nearby headquarters of the Wild Company which bore the greatest part of the construction and equipment costs.

The station at the southern end of the new base line was established on the rock plateau of the Montlinger Berg, about 60 meters above the plain of the Rhein, and the station at the northern end at the southwest corner of the Rhein bridge between Widnau and Diepoldsau. The length of the base line is approximately 7,254 meters. Its mean elevation above sea level is 416 meters.

The base expansion net consists of two quadrilaterals. The accuracy estimate for these two quadrilaterals based on an expansion ratio of 6.1 yields an error of $m = \pm 0.103$ meters and a relative accuracy of 1:425,000 for the line Pfaender–Saentis.

For the measurement of the base line which follows the dam on the left bank of the "Neue Rhein," 5 points were established along the line. The measurement was carried out with 12 invar wires and Witram tension blocks of various types. A detailed account of the measuring procedure is given.

The interferometer check base of Munich was used for the comparison of the wires for both the Munich and the Heerbrugg base lines.

The alignment of the measuring stakes of the broken base was observed with Wild T-3 theodolites. A short horizontal rod with centimeter and millimeter graduations was used for the measurement of the eccentricities, which was carried out in three sets. The observation of the main angles was carried out before and after the base-line measurement in ten sets each. The base leveling was carried out with the automatic Zeiss-Opton leveling instrument Ni 2 ($m\Delta^h \backsim \pm 0.3$ to 0.2 mm).

The results of the wire measurements were submitted to a check evaluation with preliminary constants from laboratory comparisons. The internal accuracy of the measurements for the individual sections was on the average better than 10^{-6}. The computation of the final base length will be carried out in co-operation of the participating institutes. In order to determine the effect of the gravity difference between the base and the comparison base (effect of change in tension), gravimetric measurements will be carried out by the Swiss.

All points of the expansion net, with the exception of the two base end points, belong to the existing trigonometric nets of Switzerland and Austria. Searchlights were used for signaling and targets during observations.

For observational purposes the net was di-

vided into three independent quadrilaterals. In view of the terrain relief and the expected lateral refraction, the whole net was observed with equal weights. As measuring procedure, the sector method was selected and the weight for an individual angle was determined at $p = 36$ or for the sector angle with n individual angles with $p' = p\frac{n-1}{n}$. The observation of all three quadrilaterals was carried out with Wild T-3 theodolites. The observations belonging to the individual quadrilaterals were combined as station adjustments. The mean error of an adjusted angle was on the average $\pm 0.12''$ and the corresponding direction error $\pm 0.085''$. These very small mean errors show the high internal accuracy.

With a view to the constant effect of systematic errors, the probable physical causes for the rather large triangle closure of $/''\max/ = 1.7''$ were studied. Not all of the effects of horizontal refraction which are caused mainly by relief could be eliminated by the observational arrangement. On the basis of available data (components of the deflection of the vertical ξ and η from the equation of the deflection of the vertical of the entire European net and the formula for the error of the vertical axis) some constant effects Δ of the deflection of the vertical on directions of the net have been computed and given while some others are still unknown. In addition, on all points of the net, the curvature of the plumb line (*Lotkruemmung*) shall be determined either gravimetrically or on the basis of the topographic relief.

There follows a discussion concerning modern electronic distance measuring equipment which was not used in this operation.

The further evaluation of the Heerbrugg base line and its future use for investigations with electronic measuring procedures is planned.

OESTERREICHISCHE ZEITSCHRIFT FUER VERMESSUNGSWESEN (German) AMS-GL-B661.-7000 Vol. 48, Nos. 1, 2, 3 (1960)-mc

788 *Determination of the Relative Deflections of the Vertical and the Coefficient of Refraction in the Adjustment of Trigonometrically Determined Elevation Nets* (Bestimmung der relativen Lotabweichungen und des Refraktionskoeffizienten beim Ausgleich trigonometrisch gemessener Hoehennetze). Ludvik Hradilek

The third of a series of three papers* is presented concerning a new method for the precise determination of elevations and the preliminary results of the adjustment of a net surveyed in the western part of the High Tatra in 1958.

The trigonometric elevation measurements in this region were repeated in 1959, supplemented by astronomic observations and checked by leveling. Special attention was given to refraction since it has been shown that the correct determination of the value of the refraction coefficient is indispensable for a reliable determination of elevations.

In order to investigate the possibility of determining the coefficient of refraction in the process of a net adjustment, the net surveyed in 1959 was adjusted twice. In the second adjustment, the values of zenith distances at three points (Nos. 2, 10, and 16) observed under different conditions vary by up to 27cc from those used in the first adjustment and the difference of refraction coefficients computed from two different measurements at these points was 0.05. The differences between the twice-determined deflections of the vertical and the orthogonal surfaces derived from them were very small and the computed elevations differed by a negligible amount; only on four points the difference amounted to 1 cm. and on one point to 2 cm.

Since on peripheral points of the net, where the sighting comprises only a small section of the horizon, it was impossible in the process of the adjustment to separate the refraction from the deflection of the vertical, the components of deflection of the vertical meridional plane for points 1 and 16 were taken by astrogeodetic data. Astronomic latitudes obtained on the next four points served to check the values of the deflection of the vertical obtained from geodetic leveling; the differences averaged 2.8".

The net of spirit leveling (computed elevations) was connected with the leveling net at points 1 and 16. The elevation for point 10, which is about 17 km. from the reference benchmark of the leveling net, was obtained by leveling and differed from the geodetically obtained elevation by 1.5 cm. in the first adjustment and 1 cm. in the second adjustment.

A very good agreement, on the average of 3 cm., between the values of elevations determined in 1958 and 1959 existed, even with respect to the system discrepancies of the deflections of the vertical of 1958 and 1959 for the peripheral points.

These results support the theory that under certain conditions it is practically possible, with dependable values of refraction coefficients, to determine the elevations above sea-level by

* Two previous papers were published in *Studia Geophysica et Geodaetica* Vol. 2 No. 2 (abstracted by AMS in Vol. IV No. 1) and Vol. 3 No. 4.

means of forward and backward leveling even without data on the deflection of the vertical.

Since refraction can be determined as a result of the net adjustment, it is not necessary to restrict the period of observation of the vertical angles to the moment of minimum refraction. Observations can be carried out early in the morning, in the evening, even at night when the condition of an equally large effect of refraction on all sightings from one point are expected to be better satisfied than in measurements during a sunny day.

STUDIA GEOPHYSICA ET GEODAETICA (German) AMS-GL-B662.7400 Vol. 4, No. 3 (1960)-mc

792 *Final Report on the Adjustment of the European Leveling Nets in 1958–59 (Reseau Europeen Unifie de Nivellement-REUN) of the Munich Computation Office* (Schlussbericht zur Ausgleichung der europaeischen Nivellementsnetze 1958–59 (Reseau Europeen Unifie de Nivellement-REUN) der Rechenstelle Muenchen.) Max Kneissl

The adjustment of the REUN was carried out under the auspices of the IUGG. A summary is given of the resolutions adopted by the IUGG Study Commission at its meeting in Florence, 1955. The terms "Geopotential Number" and "Geopotential Unit" are briefly explained, followed by a short review of the preparatory work. Three methods of adjustment were used: The Gauss-Volger Step-by-Step Method, the method of Conditional Observations, and the method of Indirect Observations. All results showed satisfactory agreement. Various electronic computers were used. Numerous tables, diagrams and charts complete the report.

DEUTSCHE GEODAETISCHE KOMMISSION BEI DER BAYERISCHEN AKADEMIE DER WISSENSCHAFTEN, Publications Series B: Applied Geodesy (German) AMS-GL-B644.2250 No. 63 (1960)-ms

793 *Geodetic Measurements during the Summer 1959 Operations of the International Glaciological Greenland Expedition (EGIG)*

Detailed reports of the two working groups carrying out geodetic operations for the International Glaciological Greenland Expedition (EGIG)—mainly concerned with the study of the inland ice—are presented in two articles, one by H. Maelzer on leveling and the other by W. Hofman on position determination.

Geometric leveling which satisfies the requirements of glaciology and geophysics was carried out along the west-east profile of Greenland at approximately 70° latitude north, partly on foot through the break and crevice area at the western edge of the inland ice and partly with the support of weasels over the inland ice. Leveling was carried out forward and back with two N2 arctic levels on rigid tripods and two 4-meter foldable rods. In addition to this, barometric elevations were determined with six aneroids. After preliminary computations, it is expected that the resulting mean error per kilometer for forward and backward leveling will be on the order of ± 1.5 cm. The relative difference in elevation from station to station might be determined with an accuracy of 4–6 cm. Elevations were transferred over the inland ice of Greenland over a distance of nearly 700 km.

A continuous west-east profile of marked points was established across the inland ice along the same latitude from Camp VI to Cecilia Nunatak with the aid of weasels. All distance measurements were carried out by means of the Tellurometer. The stretches from Camp VI to Carrefour and from Jarl-Joset station to Cecilia Nunatak were bridged by traverses. The remainder was carried out by a pure trilateration with diagonal quadrilaterals of varying forms.

The length of the chain of quadrilaterals is 651 km. and that of the traverses along the edges 274 km. There are 104 stations of which 76 were marked. The average distance between marked stations is 12.2 km.

Since the physical conditions on the inland ice are especially favorable to Tellurometer measurements, a high degree of precision was obtained. The constancy of the scale of the Tellurometer measurements was regularly checked by means of a frequency-testing instrument. Frequency distortions observed in Greenland amounted to 19 Hz. at maximum, which corresponds to a change in scale of 1:500,000. The accuracy of the distances measured is expected to agree with the internal accuracy of the Tellurometer of 4–5 cm.

For the purpose of repeat measurements, two calibrating distances were established and permanently marked: One in the west, 24 km. long; the other in the east, 6 km. long.

The coordinates of six principal points on the west-east profile were determined astronomically with precision theodolites (Kern DKM 3a, Wild T-3 and T-2). Preliminary estimates showed that the accuracy obtained was not below that of precise observations in mean latitudes.

A north-south profile running about 100 km.

behind the western edge of the ice was started at Terme EGIG and ended about 40 km. north of Point Sud. The marks of this profile were connected by a traverse. Coordinates of Terme EGIG and the azimuth of the first traverse side in the north-south profile were determined by astronomic-geodetic measurements.

International co-operation and excellent organization of the expedition are highly commended in both articles.

ZEITSCHRIFT FUER VERMESSUNGSWESEN (German) AMS-GL-B664.7001 Vol. 85, Nos. 2 & 8 (1960)-mc

809 *Towards the Extension of the Problem of the Error Ellipse* (Vers une extension du problème de l'ellipse d'erreur). A. Ansermet

A study is presented concerning the computation of the error ellipse when the measurements, redundant in number, cannot be considered as independent from one another. This problem is of possibly great interest to electronic distance measurements.* The main point is appraising and evaluating the influence of the correlation during the computation of the error ellipses with regard to the order of magnitude. The method of the variation of coordinates is applied, assuming that the weight matrix is known. It is symmetrical and the nondiagonal elements are disregarded.

The matrix obtained permits computing the a posteriori comultipliers of the unknowns whose matrix is equal to the inverse of the matrix for the normal equations.

The computation of reciprocity of the matrices occurs frequently, a priori or a posteriori. It is shown how the computer can set up a table or a nomogram which facilitates the work. Then a seminumerical application is presented.

The solution of the problem posed depends above all on the weight matrix; if the nondiagonal elements are zero or negligible, the usual theory of the error ellipse holds good. If not, an effort must be made to obtain the simplifying hypothesis: common values for p and p' respectively, for the diagonal and nondiagonal elements.

SCHWEIZERISCHE ZEITSCHRIFT FUER VERMESSUNG, KULTURTECHNIK UND PHOTOGRAMMETRIE (French) AMS-GL-B664.7200 Vol. 58, No. 9 (1960)-ma/ms

816 *The Fourth Artificial Satellite in Flight* (Chetvertyi iskusstvennyi sputnik v polete). N. P. Slovokhotova

In the USSR there are about 90 optical stations and observatories engaged in the observation of artificial earth satellites. These stations are especially equipped. Visual observations are being carried out with the AT-1 astronomic telescope with an objective of about 5 cm. diameter and a field of vision of about 11°. Some stations are equipped with "Kiyev" and "Zorkiy" cameras.

Precise photographic observations are being carried out with the special NAFA-3c/25 cameras (the objective has a diameter of 10 cm., aperture 1/2.5) at 29 stations. A number of neighboring as well as Asiatic and African countries were also equipped by the USSR for such observations.

Up to June 1960, a total of 4,000 observations of the fourth Soviet satellite have been received from the Russian stations, and 2,000 from abroad, mostly from Finland and France.

PRIRODA (Russian) L. C. S10891 No. 9 (1960)-ma

817 *Certain Problems in Transliterating Geographic Names for Mapping Purposes* (Nekotorye voprosy peredachi geograficheskikh nazvanii na kartakh). E. M. Pospelov

In the field of transliterating geographic names considerable progress has been made since the end of WW II. There are more than 30 specifications concerning the transliteration of geographic names of the world published by the Permanent Interdepartmental Commission for Problems of Transliteration. There are reference books and manuals, such as a publication entitled "Fundamentals of the Production of Topographic Maps." Yet there are a number of contradictions too. The manuals obligatory for topographic operations are not used in cartographic work. No standard specifications have been published concerning transliteration of foreign names. Furthermore, there are traditional names which cannot be ignored.

GEODEZIYA I KARTOGRAFIYA (Russian) AMS-GL-B675.2214 No. 10 (1959)-ma

* *See* Abstracts, Vol. V, No. 4, page 52—EDITOR

Map Information

This department was inaugurated for the purpose of bringing to the attention of the members information pertaining to the availability of maps, surveys, etc., with particular emphasis on how such material can be procured. It is believed that through an interchange and dissemination of such information maximum benefits will accrue to the surveying and mapping profession.—EDITOR

Topographic Maps

THE FOLLOWING quadrangle maps were published or became available for distribution by the U. S. Geological Survey between March 1 and May 31, 1961. The list includes newly compiled maps; revised maps on which contours and drainage usually are unchanged, but the works of man are brought up to date; and series converted maps which are 15-minute maps produced from four 7½-minute maps of the same area. The maps are new unless otherwise designated by numerical superscript.

The quadrangle name (in capital letters) is followed by the name of the county (in upper- and lower-case letters) that contains the place or feature for which the quadrangle is named.

All maps are available with or without the green overprint that indicates woodland. These maps show the shape and elevation of the land surface (represented by contour lines, printed in brown—except those marked with the letter (P), which are planimetric); water features (in blue); works of man, including cities, towns, and scattered habitations, schools, churches, railroads, roads and boundaries, place and feature names (in black); and woodland areas (in green). Principal roads are shown by a red overprint. In areas that have been covered by the Bureau of Land Management surveys, township and section lines are shown. The State rectangular coordinates and the UTM 1,000-meter grid systems are indicated in the margins of the maps. An information folder further describing topographic maps is available on request.

Standard quadrangle maps may be obtained for 30 cents per copy. A discount of 20 percent is allowed on orders amounting to $10 or more at the retail price; a discount of 40 percent is allowed on orders amounting to $60 or more. Orders should be addressed to the U. S. Geological Survey, Washington 25, D. C., (or Denver 15, Colorado, for maps of areas west of the Mississippi River).

---

* Indicates 15-minute quadrangles; all others are 7½-minute quadrangles.
[1] Indicates a revised map.
[2] Indicates a series-converted map.
† Indicates availability in either a contour or a shaded-relief edition.
‡ Indicates preliminary black and white edition.

Alabama
BEE BRANCH—Lawrence
UPSHAW—Winston

Alaska
ANCHORAGE A-6*
ANCHORAGE A-7*
ANCHORAGE B-6*
ANCHORAGE B-7*
HEALY C-1*
HEALY C-2*
SLEETMUTE C-1*
SLEETMUTE C-2*
SLEETMUTE C-4*
SLEETMUTE D-1*
SLEETMUTE D-3*
SLEETMUTE D-4*
TYONEK A-5*
TYONEK B-3*
TYONEK B-4*
TYONEK B-5*
TYONEK C-3*
TYONEK C-4*
TYONEK C-5*
TYONEK D-1*
TYONEK D-2*
TYONEK D-3*

Arizona
ORACLE*—Pinal
VACA HILLS*—Pima

Arizona-California
BLACK PEAK*—Yuma

Arkansas
GRAVELLY*—Yell
PARKS*—Scott

Arkansas-Louisiana
TAYLOR—Columbia
WALKERVILLE—Columbia

California
ACTON—Los Angeles
ARCATA SOUTH—Humboldt
ASTI—Sonoma
BARTLETT MTN.—Lake
BIRD VALLEY—Yolo
BROOKS—Yolo
CAMERON CORNERS—San Diego

CHILES VALLEY—Napa
DETERT RESERVOIR—Lake
DRY MOUNTAIN*—Inyo
ESPARTO—Yolo
FERNDALE—Humboldt
FIELDS LANDING—Humboldt
GLASCOCK MTN.—Yolo
HIGHLAND SPRINGS—Lake
JACUMBA*2—San Diego
KERN PEAK*—Tulare
MARK WEST SPRINGS—Sonoma
MONACHE MTN.*—Tulare
MONTICELLO DAM—Napa
MOUNT ST. HELENA—Sonoma
OLANCHA*—Inyo
POINT ARGUELLO*2—Santa Barbara
RABBIT PEAK*2—Riverside
SAN SIMEON*2—San Luis Obispo
THE GEYSERS—Sonoma
WALTER SPRINGS—Napa
WARNER SPRINGS—San Diego
WILDWOOD SCHOOL—Yolo

Colorado

ANTERO RESERVOIR*—Park
BLACK MOUNTAIN*—Park
CREEDE*—Mineral
FLORENCE SE—Fremont
GATEWAY1—Mesa
GUFFEY*—Park
HORN PEAK—Custer
JUANITA ARCH1—Mesa
MONTEZUMA*2—Summit
PINE MOUNTAIN1—Mesa

Connecticut

BETHEL1—Fairfield

Georgia

CARNESVILLE—Franklin
DYER GAP—Fannin
HARTWELL—Hart
HEPHZIBAH*2—Richmond
ROYSTON—Franklin

Georgia-South Carolina

HARTWELL DAM—Hart

Hawaii

KAILUA—Hawaii
KAUNENE—Hawaii
PUULOA1—Honolulu

Idaho

LAKE WALCOTT*—Cassia

Illinois

MARQUETTE HEIGHTS—Tazewell
PEKIN—Tazewell

Illinois-Indiana

MOUNT CARMEL—Wabash

Indiana

ANDERSON NORTH—Madison
ENGLISH LAKE—Starke
FORAKER—Elkhart
INDIANAPOLIS EAST1—Marion
KEMPTON—Tipton
KOKOMO EAST—Howard
MILLERSBURG—Elkhart
NORTH LIBERTY—St. Joseph
OLIVER LAKE1—Lagrange
POSEYVILLE—Posey
SHIRLEY—Hancock
STILLWELL—La Porte
SULPHUR SPRINGS—Henry
TOPEKA—Lagrange
YOUNG AMERICA—Cass

Indiana-Illinois

EAST MOUNT CARMEL—Gibson

Iowa

MASON CITY*—Cerro Gordo

Kansas

ARRINGTON—Atchison
FAIRVIEW—Brown
GARDEN CITY EAST—Finney
GARDEN CITY SW—Finney
GARDEN CITY WEST—Finney
GARDEN CITY 3 NE—Haskell
GARDEN CITY 3 NW—Haskell
GARDEN CITY 3 SE—Haskell
GARDEN CITY 3 SW—Haskell
HEIZER—Barton
HICKOK NE—Haskell
HICKOK SE—Haskell
HOLTON—Jackson
PLYMELL—Finney
SABETHA—Nemaha
YAGGY—Reno

Kentucky

JEFFERSONTOWN1—Jefferson

Louisiana

BASILE*—Evangeline
DE RIDDER*—Beauregard
EAST DELTA*1—Plaquemines
GRAND BAYOU—Cameron
LATANIA LAKE—Cameron
WEST DELTA*1—Plaquemines

Maine

THE FORKS*—Somerset

Maine-New Hampshire

NEWFIELD*1—York

Maryland-Delaware

OCEAN CITY*—Worcester

Massachusetts

SPRINGFIELD NORTH1—Hampden

Mississippi

SHARON*—Madison

Mississippi-Louisiana

ST. FRANCISVILLE*—East Feliciana

Missouri

BROOKLINE—Greene
CLIMAX SPRINGS—Camden
CROSS TIMBERS—Hickory
GRANVILLE—Monroe
HUNNEWELL—Shelby
PARIS WEST—Monroe
REPUBLIC—Greene
ROWENA—Audrain
SPRINGFIELD—Greene
TUNAS—Dallas

Montana

ARLEE*—Lake
CENTENNIAL MOUNTAIN*—Chouteau
ELLISTON*—Powell
LAREDO*—Hill
PERMA*—Sanders
PLAINS*—Sanders
SHAMBO*—Hill
WARRICK*—Chouteau

Nevada

COMINS LAKE—White Pine
CONNORS PASS*—White Pine
HINKEY SUMMIT*—Humboldt
OROVADA*—Humboldt
REIPETOWN—White Pine
REIPETOWN*—White Pine
SACRAMENTO PASS*—White Pine
SCHELL PEAKS*—White Pine

New Hampshire-Vermont

NORTH HARTLAND—Windsor

New Jersey

ADELPHIA1—Monmouth
ALLENTOWN1—Monmouth
CASSVILLE1—Ocean
KESWICK GROVE1—Ocean
LAKEHURST1—Ocean
NEW EGYPT1—Ocean
ROOSEVELT1—Monmouth
WHITING1—Ocean

New Mexico

RILEY*—Socorro
RINCON—Dona Ana

New York

AUBURN*2—Cayuga
BALDWINSVILLE*2—Onondaga
BOYLSTON CENTER—Oswego
CLYDE*2—Wayne
ORWELL—Oswego
OSWEGO*2—Oswego
SAINT LAWRENCE—Jefferson
WATERTOWN—Jefferson

North Carolina

FAYETTEVILLE*1—Cumberland
JACKSON SPRINGS*1—Moore
SOUTHERN PINES*1—Moore

North Carolina-Tennessee

ZIONVILLE—Watauga

Ohio

CRESTLINE*1—Crawford
EAST CLARIDON—Geauga
ELMORE—Ottawa
HURON—Erie
MIDDLEFIELD—Geauga
MIDDLETOWN—Butler
MINERVA—Carroll
PUT-IN-BAY—Ottawa
SANDUSKY—Erie

Oklahoma

BETHEL*—McCurtain
COLLINSVILLE NE—Rogers
SAYRE*—Beckham
SMITHVILLE*—McCurtain
VERA—Washington

Oregon

BEATTY*—Klamath
DOG MOUNTAIN*—Harney
HARNEY*—Harney
MALIN*—Klamath
SISTERS*—Deschutes
STRAWBERRY BUTTE*—Lake
THREE FINGERED JACK*—Jefferson

Pennsylvania

CLEARFIELD—Clearfield
FRENCHVILLE—Clearfield
GLASSPORT1—Allegheny
GREENCASTLE—Franklin
KARTHAUS—Clearfield
McKEESPORT1—Allegheny
PITTSBURGH EAST1—Allegheny
PITTSBURGH WEST1—Allegheny

Pennsylvania-New York

BRADFORD*—McKean

South Carolina

FORK—Dillon
JAMES ISLAND—Charleston
SPRING ISLAND—Beaufort

South Carolina-North Carolina

COWPENS*—Spartanburg

Tennessee-North Carolina-Virginia

GRAYSON—Ashe

Texas

HURST—Tarrant
POWELL—Navarro
STREETMAN—Freestone
WINKLER—Freestone

Vermont-New Hampshire

HARTLAND—Windsor

Virginia

MARSHALL—Fauquier
MINE RUN—Orange
ORLEAN—Fauquier
RECTORTOWN—Fauquier
UNIONVILLE—Orange

Washington

ABERDEEN*—Grays Harbor
MOCLIPS*—Grays Harbor
STEILACOOM[1]—Pierce

West Virginia

COLEBANK—Preston
KINGWOOD—Preston
LEAD MINE—Tucker
ROWLESBURG—Preston

West Virginia-Pennsylvania

BRUCETON MILLS—Preston

Wisconsin

BARABOO*—Sauk
HARTLAND—Waukesha
HELENVILLE—Jefferson
IXONIA—Jefferson
JEFFERSON—Jefferson
LAKE MILLS—Jefferson
MADISON*[2]—Dane
MENOMONEE FALLS—Waukesha
MERTON—Waukesha
OCONOMOWOC EAST—Waukesha
OCONOMOWOC WEST—Waukesha
STONEBANK—Waukesha
SUSSEX—Waukesha
WATERLOO—Jefferson
WATERLOO*[2]—Jefferson
WATERTOWN—Jefferson
WATERTOWN*[2]—Jefferson
WAUKESHA—Waukesha
WAUKESHA*[2]—Waukesha
WAUWATOSA—Milwaukee

Wyoming

ARAPAHOE[1]—Fremont
ETHETE[1]—Fremont
MORTON[1]—Fremont
PAVILLION SE[1]—Fremont
RIVERTON WEST[1]—Fremont

In addition to the standard series of quadrangle maps, small-scale (1:250,000) maps of areas in the United States and Territories are being published and distributed. They may be purchased from the Geological Survey for 50 cents per copy. An index to the series is available on request.

Arizona	*Arizona-Utah*	*California*	*Montana-Canada*
WILLIAMS	MARBLE CANYON	SAN FRANCISCO	KALISPELL

Special metropolitan and vicinity maps of major United States cities are being published and distributed by the Geological Survey. These maps are prepared from standard 7½-minute maps at the scale of 1:24,000. Vicinity maps may be purchased from the Geological Survey for the prices indicated below.

ALBUQUERQUE AND VICINITY, NEW MEXICO.[1] (41 by 45½ inches) $1.50.
NEW YORK AND VICINITY (BROOKLYN, NEW YORK-NEW JERSEY). (39 by 53½ inches) $1.50.
NEW YORK AND VICINITY (HARLEM, NEW YORK-NEW JERSEY). (39 by 53½ inches) $1.50.
NEW YORK AND VICINITY (OYSTER BAY, NEW YORK-CONNECTICUT). (39 by 53½ inches) $1.50.
NEW YORK AND VICINITY (PLAINFIELD, NEW JERSEY-NEW YORK). (39 by 53½ inches) $1.50.
NEW YORK AND VICINITY (SANDY HOOK, NEW JERSEY-NEW YORK). (44 by 54 inches) $1.50.

The following National Park Maps are now available.

BANDALIER NATIONAL MONUMENT AND VICINITY, NEW MEXICO.† (41 by 52 inches) 1:24,000 scale. $1.50.
CRATER LAKE NATIONAL PARK AND VICINITY, OREGON.† (25 by 35 inches) 1:62,500 scale. 75 cents.
WIND CAVE NATIONAL PARK AND VICINITY, SOUTH DAKOTA.† (37 by 41½ inches) 1:24,000 scale. $1.50.
YOSEMITE VALLEY, YOSEMITE NATIONAL PARK, CALIFORNIA. (19 by 42 inches) 1:24,000, 50 cents.

Special maps

ISLAND OF MOLOKAI, HAWAII (1952) (21 by 47 inches) 1:2,500 scale. 50 cents.†

Lake Survey Charts

PUBLICATION of new editions of the following Lake Survey Charts has been announced by the United States Lake Survey of the Corps of Engineers, U. S. Army. Copies of these charts may be obtained from the U. S. Lake Survey, 630 Federal Building, Detroit 26, Michigan, at $1.00 per copy. Payment is required in advance by P. O. money order or draft, payable to the Treasurer of the United States. A catalog showing the areas described below is available free upon request.

11.—St. Lawrence River. St. Regis, Quebec, to Croil Islands, N. Y., at 1 : 30,000 scale.
12.—St. Lawrence River. Croil Islands to Leishman Point, N. Y., at 1 : 30,000 scale.
13.—St. Lawrence River. Leishman Point to Ogdensburg, N. Y., at 1 : 30,000 scale.
39.—Lake Erie. West end of the lake, Pelee Point, Ont., and Sandusky, Ohio, to mouth of Detroit River, at 1 : 100,000 scale.
51.—Lake Huron. Head of the St. Clair River, to Pointe aux Barques, Mich., and to Porth Albert, Ont., at 1 : 120,000 scale. Insets: Harbor Beach, Mich., at 1 : 10,000 scale, and Port Sanilac, Mich., at 1 : 5,000 scale.
52.—Lake Huron. Pointe aux Barques, Mich., to 11 miles north of Oscoda, Mich., including Saginaw Bay, at 1 : 120,000 scale. Insets: Tawas Harbor, Mich., at 1 : 30,000 scale, and entrance to AuSable River, Mich., and the new harbor at Port Austin, Mich., at 1 : 10,000 scale.
60.—Lake Huron. Detour Passage to Waugoshance Point, Mich., at 1 : 80,000 scale. Insets: Mackinac Island, Mich., at 1 : 10,000 scale, and Cheboygan, Mackinaw City, and St. Ignace, at 1 : 15,000 scale.
84.—Lake of the Woods. Southern part of the lake, south of Northwest Angle Inlet, and west of Sabaskong Bay, Ont., at 1 : 120,000 scale. Insets: Warroad and Rainy River, Minn., at 1 : 20,000 scale.
93.—Lake Superior. Grand Marais, Mich., to Big Bay Point, Mich., at 1 : 120,000 scale. Inset: Big Bay Harbor, Mich., at 1 : 5,000 scale.
94.—Lake Superior. Big Bay Point, Mich., to Redridge, Mich., including Keweenaw Peninsula and Keweenaw Waterway at 1 : 120,000 scale. Insets: Eagle Harbor, Mich., and Copper Harbor, Mich., at 1 : 15,000 scale, Grand Traverse Bay Harbor, Mich., at 1 : 5,000 scale, and Lac Labelle Harbor, Mich., at 1 : 10,000 scale.
823.—Rainy Lake. International Falls, Minn., to Dryweed Island, Minn., at 1 : 25,000 scale.

Public Land Survey Plats

THE FOLLOWING plats of public land surveys and resurveys were completed and accepted by the Bureau of Land Management between March 1 and May 31, 1961. The class and purpose of the survey is indicated. Copies of plats may be secured from the Bureau offices in the States or from the Director, Bureau of Land Management, Department of the Interior, Washington 25, D. C.

Alaska

U. S. Survey No. 3709, Forest Elimination, Wrangell

Alaska—Seward Meridian

T. 16 S., R. 46 W.—Original survey
T. 17 S., R. 46 W.—Original survey
T. 17 S., R. 47 W.—Original survey
T. 15 S., R. 65 W.—Summit Island
T. 16 S., R. 65 W.—Summit Island
T. 15 S., R. 66 W.—Summit Island
T. 16 S., R. 66 W.—Summit Island
T. 17 S., R. 66 W.—Crook and Black Rock Islands
T. 18 S., R. 66 W.—Crook and Black Rock Islands
T. 17 S., R. 67 W.—Crook and Black Rock Islands
T. 18 S., R. 67 W.—Crook and Black Rock Islands
T. 16 S., R. 67 W.—High Island
T. 17 S., R. 67 W.—High Island
T. 17 S., R. 68 W.—High Island
T. 18 S., R. 67 W.—Twin Islands

California—Mount Diablo Meridian

T. 7 N., R. 1 E.—Department resurvey, part of subdivisions
T. 20 N., R. 6 E.—Department resurvey, part of subdivisions
T. 19 N., R. 9 E.—Department resurvey, part of subdivisions
T. 5 N., R. 14 E.—Dependent resurvey, part of subdivisions
T. 17 N., R. 7 W.—Dependent resurvey, part of subdivisions
T. 31 N., R. 7 W.—Dependent resurvey, part of subdivisions
T. 31 N., R. 8 W.—Dependent resurvey, part of subdivisions
T. 22 N., R. 16 W.—Dependent resurvey, part of subdivisions
T. 23 N., R. 16 W.—Dependent resurvey, part of subdivisions
T. 14 S., R. 1 E.—Fort Ord Military Reservation resurvey, part of boundary
T. 14 S., R. 2 E.—Fort Ord Military Reservation reservey, part of boundary
T. 15 S., R. 2 E.—Fort Ord Military Reservation resurvey, part of boundary
T. 15 S., R. 3 E.—Fort Ord Military Reservation resurvey, part of boundary

California—San Bernardino Meridian

T. 7 N., R. 2 W.—Dependent resurvey, part of subdivisions
T. 8 N., R. 2 W.—Dependent resurvey
T. 8 N., R. 3 W.—Dependent resurvey, part of subdivisions
T. 1 S., R. 20 E.—Dependent resurvey and extension survey
T. 8 S., R. 22 E.—Dependent resurvey and accretion survey
T. 9 S., R. 22 E.—Dependent resurvey and accretion survey

Idaho—Boise Meridian

T. 1 S., R. 36 E.—Survey of islands and omitted lands
T. 2 S., R. 36 E.—Survey of islands and omitted lands

New Mexico—New Mexico Principal Meridian

Navajo Indian Reservation—Retracement of portion of original boundary.

Oklahoma—Indian Meridian

T. 18 N. R. 8 W.—Survey of accretion
T. 8 N., R. 12 W.—Dependent resurvey and subdivisional survey
T. 9 N., R. 12 W.—Dependent resurvey and subdivisional survey
T. 9 N., R. 13 W.—Dependent resurvey and subdivisional survey

Oregon—Willamette Meridian

T. 27 S., R. 14 E.—Dependent resurvey, part of subdivisions
T. 29 S., R. 6 W.—Dependent resurvey, part of subdivisions
T. 39 S., R. 13 W.—Dependent resurvey, part of subdivisions

Utah—Salt Lake Meridian

T. 20½ S., R. 19 E.—Survey, part of subdivisions
T. 38 S., R. 9½ E.—Survey of exteriors
T. 39 S., R. 1 W.—Skeleton survey
T. 40 S., R. 1 W.—Skeleton survey
T. 36 S., R. 2 W.—Survey of exteriors
T. 38 S., R. 2 W.—Skeleton survey
T. 39 S., R. 2 W.—Skeleton survey
T. 40 S., R. 2 W.—Skeleton survey
T. 39 S., R. 2½ W.—Skeleton survey
T. 40 S., R. 3 W.—Skeleton survey

County General Highway Maps

THE FOLLOWING county general highway maps were received by the U. S. Bureau of Public Roads, Washington, D. C. during the period from March 1, to May 31, 1961. Copies of these maps are sent to the Washington office, as part of the continuing cooperative Federal-State highway planning program, as they are completed or revised by the State highway departments.

Inquiries concerning prices, and orders should be sent to the respective State highway departments and not to the U. S. Bureau of Pubic Roads.

Florida
LEE
POLK

Idaho
BEAR LAKE

Illinois
ADAMS
CHAMPAIGN
CLARK
CLAY
CRAWFORD
FAYETTE
HENDERSON
LA SALLE
MACOUPIN
MONTGOMERY
OGLE
POPE
PULASKI
STEPHENSON
WARREN

Indiana
HUNTINGTON
WAYNE
WHITLEY

Kansas
ATCHISON
CHEYENNE
CLAY
GREELEY
LEAVENWORTH
LOGAN
MEADE
OTTAWA

Louisiana
EAST CARROLL
MADISON
OUACHITA
RICHLAND

Maryland
GARRETT
HARFORD
HOWARD
WASHINGTON

Michigan
ALGER
DELTA
DICKINSON
MARQUETTE
MENOMINEE

Minnesota
CARLTON
GRANT
ITASCA
WILKIN

Mississippi
GRENADA
KEMPER
SHARKEY
TALLAHATCHIE
YALOBUSHA

Missouri
CAPE GIRARDEAU
DALLAS
GREENE
LACLEDE
ST. FRANCOIS
SHANNON

Montana
MINERAL

Nebraska
WASHINGTON

North Dakota
CASS
CAVALIER
GRIGGS
NELSON
PEMBINA
TRAILL
WALSH

Tennessee
BLEDSOE
FENTRESS
OVERTON
PICKETT
PUTNAM
VAN BUREN
WARREN
WHITE

Utah
RICH
SAN JUAN

Coast and Geodetic Survey Charts

THE FOLLOWING are new or basically changed nautical and aeronautical charts issued by the Coast and Geodetic Survey during the last period. Copies may be secured from Bureau offices and authorized agents in the United States and possessions, or from the Director, Coast and Geodetic Survey, Washington 25, D. C. Remittances covering cost should be made payable to Coast and Geodetic Survey, Department of Commerce. Complete catalogs of both nautical and aeronautical charts are issued free upon request.

Nautical

140.—Fort Pierce to Miami, Fla. Series revised from information received since initial printing in 1960. Consists of four sheets at scale 1 : 40,000 with 1 : 25,000 scale enlargements of active boating areas supplemented by recent photographs of prominent land features and harbor entrances. Folio size 8½ × 15½ inches. (Jan. 1961) $2.00.

234.—Cape May Harbor, N. J. Hydrography completely revised in harbor area from recent surveys by the Corps of Engineers. Shoreline revisions from 1960 aerial photography are included; at scale of 1 : 10,000 (May 1961) 25 cents.

322.—Approaches to Penobscot Bay, Me. Hydrography completely revised in Two Bush Channel and inshore waters surrounding Ragged and Matinicus Islands from basic surveys by the Coast and Geodetic Survey; at scale of 1 : 40,000 (May 1961) $1.00.

348.—Woods Hole, Mass. Includes a complete revision of hydrography from final results of basic surveys by the Coast and Geodetic Survey; at scale of 1 : 10,000 (Mar. 1961) 75 cents.

423.—Morehead City Harbor, N. C. Hydrography in vicinity of Beaufort Inlet completely revised from recent surveys by the Coast and Geodetic Survey. Edition includes the recent enlargement, by the Corps of Engineers, of the Morehead City Port Terminal turning basin; at scale of 1 :12,500 (May 1961) 75 cents.

568.—Chesapeake Bay, Md.-Va. Includes a revision of hydrography in Onancock Creek and vicinity, and south of Tangier Island from basic surveys by the Coast and Geodetic Survey; at scale of 1 : 40,000 (Apr. 1961) $1.00.

871 & 872.—Intracoastal Waterway. Ala.-Fla. Hydrography extensively revised at Pensacola Bay Entrance from recent surveys by the Corps of Engineers; at scale of 1 : 40,000 (Mar. 1961) 50 cents.

873 & 874.—Intracoastal Waterway, Ala.-Miss. Hydrography extensively revised in vicinity of Mobile Bay Entrance from advance information of surveys by the Coast and Geodetic Survey; at scale of 1 : 40,000 (Mar. 1961) 50 cents.

886 & 887. — Intracoastal Waterway — Galveston Bay to Cedar Lakes, Tex. Galveston Bay entrance hydrography extensively revised from Corps of Engineers' survey. The following charted channel limits were realigned, based on results of recent triangulation by the Coast and Geodetic Survey: Entrance, Bolivar Roads, Texas City and Houston Ship; at scale of 1 :40,000 (May 1961) 50 cents.

892 & 893.—Intracoastal Waterway, Tex. The new modified intracoastal waterway route recently completed by the Corps of Engineers from Aransas Bay to Corpus Christi Bay is included in this edition; at scale of 1 : 40,000 (Apr. 1961) 50 cents.

1007.—Gulf of Mexico. Loran lines of position for rates 1H6, 1H7, 2H6, 2H7, 2L2 and 2L3 are included

in this edition; at scale of 1 : 2,161,530 (Mar. 1961) $1.00.

1203.—Penobscot Bay and approaches, Me. Hydrography completely revised in Two Bush Channel and in the vicinity of Matinicus Island from surveys by the Coast and Geodetic Survey; at scale of 1 : 80,000 (May 1961) $1.00.

1208.—Cape Cod Bay, Mass. Hydrography in Plymouth Bay and vicinity completely revised from final results of surveys by the Coast and Geodetic Survey. Additional hydrographic information has been added offshore Cape Cod from C&GS surveys; at scale of 1 : 80,000 (May 1961) $1.00.

1217.—Little Egg Inlet to Hereford Inlet, N. J. Complete revision of hydrography in Absecon Inlet, vicinity of Atlantic City, from recent surveys by the Corps of Engineers; at scale of 1 : 80,000 (May 1961) $1.00.

1223.—Chesapeake Bay, Va. Includes extensive revisions to hydrography throughout central portion of chart from final results of basic surveys by the Coast and Geodetic Survey; at scale of 1 : 80,000 (Mar. 1961) $1.00.

1232.—Cape Hatteras, N. C. Chart extended northward to include Wimble Shoals Buoy; at scale of 1 : 80,000 (June 1961) $1.00.

1234.—Cape Lookout to New River, N. C. Includes extensive changes in hydrography and topography vicinity Cape Lookout and Beaufort from surveys by the Coast and Geodetic Survey; at scale of 1 : 80,000 (Apr. 1961) $1.00.

1273.—Barataria Bay and approaches, La. Includes individual charting of offshore oil well structures and new project channel alignment in Barataria Pass and Bayou Rigaud; at scale of 1 : 80,000 (May 1961) $1.00.

1275.—Isles Dernieres to Point au Fer, La. Includes individual charting of oil well platforms. Aids to navigation have been completely modernized; at scale of 1 : 80,000 (Feb. 1961) $1.00.

1277.—Vermilion Bay and approaches, La. Includes individual charting of oil well structures; at scale of 1 : 80,000 (Jan. 1961) $1.00.

4102.—Hawaiian Islands. Loran lines of position for rates 2L4, 2L5, 2L6 and 2L7 are included in this edition at scale of 1 : 600,000 (May 1961) $1.00.

9139.—Tagalak Island to Great Sitkin Island, Alaska. The inshore hydrography, throughout the chart, has been extensively revised from modern surveys by the Coast and Geodetic Survey; at scale of 1 : 30,000 (Mar. 1961) $1.00.

6158.—Columbia River—Lake Celilo. Chart limits: Longitude 121° 09′ W to 120° 43′ W; at scale of 1 : 20,000 (Mar. 1961) 50 cents.

6159.—Columbia River—John Day Dam to Blalock. Chart limits; Longitude 120° 44′ W to 120° 19′ W; at scale of 1 : 20,000 (Feb. 1961) 50 cents.

6160.—Columbia River—Sundale to Heppner Junction. Chart limits: Longitude 120° 21 W H to 119° 58′ W; at scale of 1 : 20,000 (Feb. 1961) 50 cents.

The above three charts (6158–6160) in Ore. and Wash., were designed and constructed to meet the needs of commercial and pleasure craft and extend the present Columbia River chart coverage from The Dalles to Heppner Junction. Two charts (6153 and 6164), included in the designed extended coverage, were published in 1960. The two remaining charts (6161 and 6162) in this program are in process of being constructed and, when published, will complete the Columbia River chart coverage from the Pacific Ocean to Pasco, at the mouth of the Snake River.

Aeronautical

Sectional charts at a scale of 1 : 500,000
- La Grande (May 1961) 25 cents
- Lake Huron (June 1961) 25 cents
- Spokane (June 1961) 25 cents
- Twin Cities (June 1961) 25 cents
- Yellowstone Park (May 1961) 25 cents

World aeronautical charts at a scale of 1 : 1,000,000
- WAC 186 (June 1961) 25 cents
- WAC 139 (May 1961) 25 cents
- WAC 407 (May 1961) 25 cents

HARRISON'S FERROMAGNETIC SURVEYORS MONUMENT

PROTECT COSTLY SURVEYS FOR CENTURIES

USE THE HARRISON SURVEYORS MONUMENT AT ALL SURVEY POINTS

ENGINEERED FOR SURVEYORS . . . .
- To be magnetically or electronically located when fully buried
- To have standard and special identifying legends
- To be the finest surveyors marker available
- To be unconditionally guaranteed
- To be surprisingly low in cost
- To last for centuries
- To resist unintentional removal

2 MODELS

FOR MORE INFORMATION & PRICES, WRITE:

Harrison Marker & Instrument Co.
SERVING SURVEYORS

P.O. BOX 588 ANOKA, MINNESOTA
TELEPHONE HARRISON 1-1445

EXTENDABLE MODEL "IT GROWS"

STANDARD MODEL

Comment and Discussion

The pages of SURVEYING AND MAPPING are open to free and temperate discussion of all matters pertaining to the interests of the Congress. It is the purpose of this department to encourage comments on published material or the presentation of new ideas in an informal way.—EDITOR

ENGINEERS—A NECESSARY OR UNNECESSARY EVIL?

EDWARD A. ROGERS, SR.*—With all the talk about "automation" and the ever-growing line of the unemployed, there is much speculation about the future of the laboring man and his problems of earning a living and meeting the needs of his livelihood. This is truly a serious situation, which is growing worse and needs the attention of the "economic giants" of our government and industry.

Yet there is another creeping, grasping movement that is to be reckoned with. It has been growing tentacles that have been encircling one construction project after another and causing the ultimate sacrifice of efficiency and accuracy on the altar of profit and greed.

From the drawing boards come maps and plans drawn on *assumed* data, accompanied by *estimated* cost, and unwritten *hope* for completion. Results are, inevitably, unforeseen obstacles, unexpected expenses, extras not paid for, and, finally, incomplete and inadequate structures that are not the pride of the architects, contractors, or owners. Behind every failure there must be a "fall guy," tch, tch—Poor Engineering.

What, then, is this new threat to American enterprise? For the lack of a better name and for an all-inclusive title, we shall call this "Auto-Engination," the practice of self-engineering. Superintendents, assistant superintendents, inspectors, assistant inspectors, carpenter foremen, or maybe a laborer who happens to be standing near the transit (which has been set up by the combined efforts of two or more of these "Auto-Engineers") gives line and elevation, and the work goes on without interruption or much of anything else.

Is there a crisis? Is there a permanent damage to be reckoned with? Just stroll around to the construction jobs in your town or State. How many jobs are on schedule? Are there many satisfied owners of buildings or structures? Is that structure too near the property line? Did that foundation go too far down, or not far enough? Did that misalignment show up too late, with the processing equipment sitting in the middle of the swinging doors? We could very well go on pointing out the money-wasting short cuts and time-saving economies that are taking the expertness out of free enterprise and leaving disorder, disillusionment, and disaster on the blueprint of the American way of life. What is the answer?

* 1310 Columbia Drive, Birmingham, Ala.

LAND SURVEYOR REGISTRATION

JESSE E. FANT*—The subject of registration requirements for land surveyors has received a great deal of thought in the past few years. It has been recognized that some formal education beyond high school should be a part of the experience required for registration. This education is desirable because a professional man should be excellently trained in his chosen field and prepared to attain a responsible position in society. It is difficult to achieve and maintain the above goals without constant study and self education either formal or informal. Most proposed registration laws realize the need for education and contain a clause requiring a college degree. This clause, however desirable, virtually guarantees that a State Board of Registration will not adopt the proposed model law in those States which now require only an examination and qualified experience for registration. The college-degree requirement would eliminate most of the possible ap-

* Assistant Professor of Civil Engineering, Department of Civil Engineering, University of Minnesota, Minneapolis 14, Minn.

plicants and result in very few men becoming registered in the next few years. A change in registration requirements should not be this extreme.

Several general proposals have been studied in Minnesota the past few years, but these have not resulted in any action by the State Board of Registration. The Education Committee of the Minnesota Land Surveyors Association decided to prepare a recommendation to the State Board in the form of a practical and workable law. The basic problem was: "How can the State Board make a change in the requirements without being unduly restrictive, yet at the same time make the examination longer, increase the experience required, and encourage a program of formal education by giving credit toward experience for courses taken and satisfactorily completed?" The following proposed requirements were presented and adopted at the April 1961 meeting of the Minnesota Land Surveyors Association as a recommendation to the State Board of Registration for Architects, Engineers, and Land Surveyors.

Proposed Requirements for Land Surveyor Registration in the State of Minnesota

Effective: *January 1, 1963*

(Italics indicate tentative items)

1. The experience of surveyors shall not be less than 8 years, 4 years of which may be formal education either by a degree in Civil Engineering or Survey Engineering from an accredited college or by the granting of one-year's experience for for each *20 semester* (*30 quarter*) credits for courses satisfactorily completed leading to a Bachelor of Science degree. Other credits, institute courses, and correspondence courses to be evaluated by the Land Surveyor Member of the State Board of Registration.

2. The minimum hours of examination time shall be 16 hours divided into two 8-hour examinations. The first 8-hour examination can be taken at the end of 4 years experience or education and shall consist of fundamental subjects (mathematics, science, drawing and descriptive geometry, English, and surveying). Upon the successful completion of this examination the applicant will be called a Surveyor-in-Training (S-I-T). The satisfactory completion of the E-I-T examination can be substituted for the S-I-T examination upon application to the State Board of Registration *within two years* after taking the E-I-T examination. After this deadline the S-I-T examination must be taken.

The second 8-hour examination shall consist of professional practice subjects (subdivision plans, geodetic surveys, topographic surveys, land and property surveys, law, etc.) and can be taken after the completion of the 8 years experience upon application to the State Board of Registration. The applicant is evaluated on work experience, references, exhibits of work, and an oral examination. Upon completion of the examination the applicant will be registered as a land surveyor in the State of Minnesota.

3. The minimum age shall be *25 years.*

The experience requirement was increased from six to eight years, four years of which may be formal education. Under the present system a graduate in civil engineering is given two years credit on his six years required. For the graduate in science the new requirement is the same as the present, he still needs four years of practical experience. For the non-graduate there is no provision in the present requirements which gives him any credit for college work taken and passed. The proposed requirements give one year's credit, up to four years, for each 20 semester (30 quarter) credits taken and passed leading to a B.S. degree. This provision, although liberal, would require almost three years of college work to achieve the four years credit. In other words, the increase of two years in experience required must be considered as an increase in the formal education required and not just additional experience. Administratively the Board of Registration needs only to decide, from local University Bulletins, if the credits lead to a Bachelor of Science degree to give credit. This provision permits the use of mathematics, science, and humanities credits to apply toward registration and prepares the way for a longer examination divided into two parts, the first part of the examination to cover the fundamental subjects and the second part to cover professional subjects.

The examination time has been increased from eight to sixteen hours. The Engineering-in-Training (E-I-T) examination is permissible for the first eight-hour examination. The Surveyor-in-Training (S-I-T) examination (not now in existence) could be gradually increased in toughness and coverage over several years, making the knowledge of fundamental college subjects a necessity for passing the examination. When the S-I-T examination becomes equivalent to the E-I-T examination the latter should possibly not be permitted as a substitute. At that time a degree as a Survey Engineer or equivalent might be considered as a requirement of taking the S-I-T examination and the registration requirements could then be revised.

The State Board of Registration in Minnesota has been very receptive to these suggested changes, and it is hoped that they can soon take definite action to upgrade the requirements of registration for Land Surveyors.

RESOLUTION OF TEXAS BOARD OF REGISTRATION FOR PUBLIC SURVEYORS

J. S. BOYLE*—Enclosed is a resolution recently passed by the Texas State Board of Registration for Public Surveyors. This has been prepared under the direction of two of the most competent attorneys in the State. I believe the resolution might be of interest to all those really interested in surveying. . . .

RESOLUTION

WHEREAS, the State Board of Registration for Public Surveyors is charged by the Registered Public Surveyors Act of 1955 with the duty and responsibility of administering that Act, and is granted the authority and power to adopt all rules and regulations it deems necessary therefor; and

WHEREAS, the legislature in Section 2(b) of said Act has broadly defined public surveying as follows:

"Public Surveying is the science or practice of land measurement according to established and recognized methods engaged in and practiced as a profession or service available to the public generally for compensation, and comprises the determination by means of survey, of the location or relocation of land boundaries and land boundary corners; the calculation of area and the preparation of field note description of surveyed land; the preparation of maps showing the boundaries and areas of the subdivision of tracts of land into smaller tracts; the preparation of official plats or maps of said land and subdivisions in compliance with the law of the State of Texas and the political subdivisions thereof; and such other duties as sound surveying practice would direct." and,

WHEREAS, the legislature in said Act has further prohibited the practice of public surveying as thus defined by any person not registered in compliance with said Act, or not exempted from the operation of the Act by Section 3 thereof; and

WHEREAS, the Texas Surveyors Association has requested the Board to consider adoption of rules and regulations, and has suggested specific rules and regulations as appropriate for adoption, which suggestion is in wording and form hereto attached as Exhibit A; and

WHEREAS, the Board has further concluded that rules and regulations are necessary to the proper administration of the Registered Public Surveyors' Act of 1955 in order to resolve dispute and controversy concerning, *inter alia,* the true extent and meaning of the exemptions provided for in Section 3 (c).

NOW, THEREFORE, be it resolved that in the Board's discharge of its duties and responsibilities of administering said Act, a public hearing shall be held on the 31st day of July, 1961, at 9:00 A.M. o'clock at the offices of the Board in Austin, Texas, at which time the Board will consider such evidence and arguments as may be presented by any interested person bearing upon the true and correct definition of public surveying, and particularly the proper extent of the exemptions provided for in Section 3 (c); and

BE IT FURTHER RESOLVED, that at said hearing, the Board will hear from any interested person or persons evidence and argument as to whether the suggestion of rules and regulations appended hereto as Exhibit A, or variants thereof should be adopted; and

BE IT FURTHER RESOLVED, that notice be given of said hearing, of this Resolution, and of the proposed Rules to each Registered Public Surveyor, to the officers and directors of the Texas Surveyors Association, to the secretary of the State Board of Registration for Professional Engineers, and to the officers and directors of the Texas Society of Professional Engineers, with the request that publicity be given to this Resolution, to the scheduled hearing, and to the proposed Rules, to the end that all interested persons may appear and present evidence or argument at the hearing hereby set.

DONE this 5th day of June, 1961.

/s/ W. J. Burkart
Vice Chairman
Texas State Board of Registration
For Public Surveyors

SEAL

EXHIBIT A.

RULES AND REGULATIONS SUGGESTED BY TEXAS SURVEYORS ASSOCIATION FOR ADOPTION BY THE STATE BOARD OF REGISTRATION FOR PUBLIC SURVEYORS.

In order to protect the public in the practice of public surveying, and in order to aid in the administration of the Registered Public Surveyors Act of 1955, the Texas State Board of Registration for Public Surveyors hereby adopts the following rules and regulations, said rules being deemed necessary:

Section 1, The following services may be per-

* Letter addressed to Walter Dix, Executive Secretary, ACSM, under date of June 14, 1961.

formed for the public only by a Registered Public Surveyor and may not be performed by anyone not so registered, except as provided in Section 2 of these rules:

a. The location or relocation of land boundaries and land boundary corners, of advice and consultation as to the application of the prinicples evolved in court decisions and the information obtained by search of General Land Office, County Surveyors and Deed Records, to the ground conditions in a determination of location upon the earth's surface of land boundaries and land boundary corners.

b. The calculation of area and the preparation of field note descriptions of surveyed lands for inclusion in contracts, deeds, leases and other instruments in which description of land areas and land boundaries and corners are necessary or appropriate.

c. All advisory work and all ground work and reporting necessary or appropriate to be performed in connection with attorneys, litigants and witnesses in litigation, which involves the determination in litigation as a result of survey of the location or relocation of land boundaries or land boundary corners, and the calculation of areas and preparation of field note description of lands, preparation of maps for use in such litigation and all related other services in his performance by a person learned in the art and science of surveying in connection with litigation.

d. All work necessary to and connected with the preparation of maps showing the boundaries and areas of subdivision of tracts of land into smaller tracts, and the preparation of official plats or maps of said land in compliance with the laws of the State of Texas and political subdivisions thereof, when such maps are to be filed in the public records and will have any or all of the following effects:

(1) To serve as a basis for conveyancing.

(2) To have the result of dedicating streets, highways, alleys or other easements in which either the public or purchaser of portions of said subdivision, or both the public and the said purchaser, shall have rights.

(3) All other services which involve the determining of land boundaries or which will serve as or result in any basis for fixing upon the surface of the earth boundaries upon which future conveyances and other land transactions will depend, and which will serve as a basis for determining where upon the face of the earth public or private rights or titles are located.

Section 2. The services set forth in Section 1 of these rules may be performed for the public only by Registered Public Surveyors, and none others, regardless of the possession of a license to practice some other profession or calling, with the following exceptions and no others:

a. County surveyor acting in his official capacity as authorized by law.

b. Licensed State Land Surveyor when acting in his official capacity as authorized by law.

c. Registered professional engineer when practicing his profession as authorized by law. The prohibitions of the Registered Public Surveyors Act of 1955 do not extend to engineers practicing the science of professional engineering as defined by the Act of 1937, Article 3271a, Vernon's Civil Statutes of Texas, when such activities involve measurement and land subdivision *for the purpose of construction,* when such activities do not involve the determination of boundary problems or other activities exclusively to be performed by Registered Public Surveyors, as such other activities are herein defined, though such activities involve techniques and instruments employed by surveyors in the practice of their science and art. The licensed activities of professional engineers are solely such as are necessary to and directed toward the prerogative of construction.

d. Official of a state, county, city or other political subdivision whose official duties include land surveying when acting in his official capacity.

e. Deputies, assistants, or employees under any person exempted by subsections a, b, and c above when acting under the direction and supervision of such exempted persons.

f. Assistant or employee of any public surveyor registered under the provisions of this Act while acting under the direction and supervision of such registered public surveyor.

Many techniques used by surveyors in the performance of their science and art are also used by members of other professions and by persons who need not be members of any profession. The prohibitions under the Registered Public Surveyors Act of 1955 do not extend to the use of such techniques by any such person *for himself,* but extend to all persons attempting to practice public surveying without being licensed as a public surveyor except as specifically exempted by the foregoing listed subparagraphs of this Section 2.

Section 3. In the event of the failure or refusal of any person to comply with the requirements of the Registered Public Surveyors Act of 1955, as interpreted by these rules, it shall be the duty of the Board to present a complaint to an appropriate prosecuting officer in accordance

with Section 8 of said Act. This duty shall not, however, prevent in a proper case the institution and prosecution, by either the Board or any other interested organization or person, of an action in a Court of competent jurisdiction to restrain and enjoin the violation of any of the preceding rules.

Section 4. If any section, subsection, paragraph, subparagraph, sentence, clause or part of the above provisions shall, for any reason, be held invalid, such decision shall not affect the remaining portions of the above provisions, and it is hereby declared to be the intention of the State Board of Registration for Public Surveyors to have promulgated and adopted each section, subsection, paragraph, subparagraph, sentence, clause, or part of the above provisions irrespective of the fact that any other section, subsection, paragraph, subparagraph, sentence, clause or part of the above provisions may be declared invalid; that is, it is the intention of the said Board that each of the above provisions and portions thereof are severable.

Section 5. These Rules are to be effective from and after the date of their adoption by the Board.

Adopted this the —— day of ————, 1961.

₹ ₹ ₹

Code of Ethics for Professional Practitioners*

A. It shall be considered unprofessional and inconsistent with honorable and dignified bearing for any professional practitioner:

1. To act for his client, or employer, in professional matters otherwise than as a faithful agent or trustee, or to accept *or give* any remuneration other than his stated recompense for services rendered.

2. To attempt to injure falsely or maliciously, directly or indirectly, the professional reputation, prospects, or business of anyone.

3. To attempt to supplant another fellow professional practitioner after definite steps have been taken toward his employment.

4. To compete with another fellow practitioner for employment by the use of unethical practices.

5. To review the work of another fellow practitioner for the same client, except with the knowledge of such practitioner or unless the connection of such practitioner with the work has terminated.

6. To attempt to obtain or render technical services or assistance without fair and just compensation commensurate with the services rendered.

7. To advertise in self-laudatory language or any other manner derogatory to the dignity of the profession.

8. To attempt to practice in any professional field in which the *professional practitioner* is not proficient.

B. All land survey work shall be done in conformity with the "Technical Standards for Property Surveys"[1] as compiled by the American Congress on Surveying and Mapping and adopted by the ACSM on June 28, 1946 (and as it may be further properly amended by ACSM).

C. The "Statement of Principles" as outlined in the document entitled "Equitable Fees for Property Surveys"[2] as compiled and adopted by the American Congress on Surveying and Mapping in 1949 (and as it may be further properly amended by ACSM), shall be considered as a statement for proper ethical practice herein.

---

* Adopted by the Property Surveys Division of the American Congress on Surveying and Mapping, January 1959, and readopted (with two changes, shown in italics in the above) by the Property Surveys Division, ACSM, March 22, 1961, and subsequently adopted by the ACSM by ballot of the Board of Direction.

[1] *See* SURVEYING AND MAPPING, July–September 1946, Vol. VI, No. 3, pages 210–213.

[2] *See* SURVEYING AND MAPPING, July–September 1949, Vol. IX, No. 3, page 165.

News of Related Organizations

Alaska Society of Professional Land Surveyors

The Alaska Society of Professional Land Surveyors held its second annual meeting on March 18, 1961, at Spenard, Alaska, and had a very successful and informative session.

One of the highlights of the meeting was the announcement that the ASPLS was officially affiliated with the ACSM.

There were several outstanding speakers, especially Harold Warwick of the Federal Housing Administration, who spoke on development procedures, and Leo M. Petersen of the Alaska Division of Lands, who discussed participation by registered land surveyors of Alaska in the subdivision of State lands.

New officers were elected, as follows:

President—Robert B. Haight
Vice President—Henning Johnson
Secretary-Treasurer—Loren H. Lounsbury
Director (three year term)—W. Muncaster

—Loren H. Lounsbury
Secretary-Treasurer, ASPLS

Central New York Society of Land Surveyors

Fourteen members were present at the May 2, 1961, meeting of the Central New York Society of Land Surveyors, which was called to order by President Tarbell at 8:00 p.m., in the Yates Hotel, Syracuse, N. Y.

Among the items of business transacted, we find that the Secretary was instructed to write letters to U. S. Senators and Representatives, and to the Postmaster General, stating the support of the CYNSLS of the drive for a commemorative stamp in recognition of the surveyor.

The speaker for the evening was Ernest Cuno, Executive Officer of the Home Builders' Association of Greater Syracuse. He discussed the organization of the association at Federal, State, and local levels; described the concepts of proper land use; and the need for more realistic regulations by town and county governments. He expressed the desire of builders to enter the field of the $9,000 to $14,000 homes, but that existing regulations seemed to make this financially impossible.

The Central New York Society of Land Surveyors met at 8:15 p.m., June 6, 1961, at the Yates Hotel, Syracuse, N. Y., with President Tarbell presiding. Among other items of business, the following matters were considered:

Joe Phillips read a letter, written by himself and Roswell Cull, addressed to S. T. Snyder, Vice President, New York State Association of Consulting Engineers and dealing with the design of sewage disposal systems by surveyors. The letter was approved and ordered mailed.

The Society voted to make William S. Gere an honorary member of the CYNSLS.

President Tarbell read a letter from the Secretary, Property Surveys Division, ACSM, concerning recent developments regarding professional liability insurance for surveyors and mappers being underwritten by Continental Casualty Co., and appointed Roswell Cull, Lou Jones, and A. Ray Holmes to study the matter for the Society.

President Tarbell read the four resolutions, adopted by the ACSM at its 21st Annual Meeting, that pertain to United States Administration and the Congress. The four resolutions were approved unanimously and members were urged to write to their Senators and Representatives seeking their support of these matters.

The model law regarding the registration of engineers and land surveyors, adopted by the National Council of State Boards of Engineering Examiners and approved by the ACSM at its 21st Annual Meeting, except for the corporate practice section, was discussed. The proposed model law was approved by the CNYSLS with an added reservation regarding Chapter II, Section 4 P (b) and recommended a maximum of two years, instead of four years, where the teaching of land surveying in an accredited engineering or surveying curriculum may be considered an equivalent of practical surveying experience.

The guest speakers were William Wolf and Steve Jones, of the Wolf Research and Development Corp., Boston, Mass., who discussed the growth and development of high-speed, digital computations by their organization for govern-

ment and industry and expressed a desire to stimulate interest in central New York, with the possibility of establishing a local office to aid engineers and surveyors in the solution of complex computational problems regarding highways, bridges, earthwork, and subdivisions.

The above is based on the minutes of the meetings as published in the CNYSLS's *Bench Marks*.—EDITOR

Florida Society of Professional Land Surveyors

Under the joint sponsorship of the Department of Civil Engineering, University of Florida, and the Florida Society of Professional Land Surveyors, the Second Land Surveyor Course was held in Gainesville, Florida, May 18–20, 1961, with 87 persons in attendance. A breakdown shows that of the 87 registered for the course there were 47 from private engineering and surveying offices, 23 from county and municipal offices, 12 from industrial organizations, and 5 from the State Roads Department. Also 29 of the registrants were registered men, but of these only 8 were principals, while two years before, at the first course, 25 were principals or heads of departments.

The course began with the registration at 8:30 a.m., May 18th and continued until 1:00 p.m., May 20th. The pace was fast, at the rate of approximately three three-hour sessions per day, and the various courses were given by the following men who covered the topics listed: Hugh Binyon, of St. Petersburg, Land Survey Descriptions I and II and Riparian Rights in Florida (Maps and Plats); H. O. Peters, of Leesburg, Land Survey Standards and Excess and Deficiency; and John P. Goggin, of Marathon, Qualifications of a Land Surveyor, Legal Aspects of Land Surveying, Ethics for Land Surveyors, and Duties of Land Surveyors, as well as a final Summation. Certificates were presented, after the Saturday morning session, by R. W. Kluge, Head, Department of Civil Engineering, University of Florida.

Based on the experience of two years before, registration was expected to be somewhere between 25 and 40—actually 62 were preregistered and 87 attended the course.

Georgia Association of Registered Land Surveyors

New officers to serve the Georgia Association of Registered Land Surveyors from July 1, 1961, to June 30, 1962, are as follows:

President—John L. Harper, Atlanta

Vice President—Bob Hensley, Decatur

Secretary-Treasurer—George Nelson, Atlanta

National Representative—C. T. Holladay, Chamblee

Alternate National Representative—Sommers J. Gastin

Directors (1961–1963) are: C. E. Ruppe, Atwood Freeman, Rhodes Sewell, Joe Hutton, and Grady Fuller.

Indiana Society of Professional Land Surveyors

The following was abstracted from the June 1961 issue of *Surveying and Mapping News* published by the Indiana Society of Professional Land Surveyors. —EDITOR

As a result of the efforts of the Indiana Society of Professional Land Surveyors and other closely related groups, the bill introduced into the 1961 General Assembly was favorably acted upon and will go into effect this summer. Much credit must go to the legislative committee under the chairmanship of Al Forgey, Brownstown. A few concessions had to be made in order to gain legislative approval but many of the shortcomings of the past registration act, as it pertains to land surveying, have been revised or minimized. The future of the land surveying profession in Indiana appears very promising!

According to Nelson Prall, who closely followed this bill through the legislature, the major changes involve:

1. Expands and clarifies the type of work to be done by the land surveyors.
2. Requires five years of combined engineering and land surveying education and experience in order to be eligible to take examination.
3. Changes examination to two days instead of one.
4. Permits only registered land surveyors to make plats.
5. Ends the county surveyor's exemption on July 31, 1962.
6. Ends the professional engineer's exemption on July 31, 1962.
7. Provides procedure by which professional engineers, now practicing land surveying, and county surveyors, who have served as such for five years, may become registered as land surveyors.

The complete detailed changes will be published this summer. The Registration Board

has indicated that they intend to set up a standard form of affidavit to satisfy item 7 above and engineers can expect to be informed of this in due time.

These new changes generally follow the newly adopted model law of the National Council of State Boards of Engineering Examiners.

The Engineers and Land Surveyor Registration Board of the State of Indiana will be ready July 1, 1961, to process new applications for those Professional Engineers who intend to continue the practice of Land Surveying after July 31, 1962.

The amendments to the Registration Act enacted by the 1961 Legislature making this a requirement after July 31, 1962, will become effective at the time of printing of the 1961 Legislative Acts which is expected to be approximately mid-summer 1961. Professional Engineer registrants who intend to register as Land Surveyors should initiate application after July 1, 1961, and complete not later than July 31, 1962. Application forms prepared by the Board will be available in July of this year. However, any Professional Engineer registrant who wishes to place his name on file in advance to receive these forms may do so by sending a written request to the Board. The amended section of the act that is involved is covered by the following extract:

Section 31

(a) Nothing contained in this act shall be so construed as to prohibit a registered professional engineer, having the qualifications to practice land surveying, as defined in this act, from practicing land surveying until July 31, 1962.

Registered professional engineers actively engaged in the practice of land surveying on or before July 31, 1962, may become registered as professional land surveyors, without examination, by submitting to the State Board of Registration for Professional Engineers and Land Surveyors, certification by affidavits, by the applicant, stating that he has been engaged in the active practice of land surveying, but such request shall be made before July 31, 1962.

(b) Nothing contained in this act shall be so construed as to prohibit a registered professional engineer from doing any work defined in Section 1 of this act which does not involve the location, description, establishment, or re-establishment of property corners or property lines.

An elected or duly appointed county surveyor who is now serving in the office of county surveyor may secure registration as a professional land surveyor, after he has been in office continuously for five years, by submitting to the State Board of Registration for Professional Engineers and Land Surveyors an application for such registration, but such request shall be made before July 31, 1966.

The County Surveyors and County Engineers Association recently turned over to the Purdue Alumni Association a sum in excess of $1,000 to start a new trust fund to be known as the Ben Petty Memorial Scholarship fund. The group voted to establish such a fund at this year's Road School meeting and has been soliciting help from industry, associations, governmental agencies, and individuals.

The scholarship will honor the memory of the late Profession Benjamin H. Petty, former professor of highway engineering and former chairman of the annual Purdue Road Schools. Arthur Buerkle, Tippecanoe County Surveyor and prime solicitor for the fund, reports that the scholarships from the fund are to go to qualified Purdue students, preferably to students studying Civil Engineering.

At the annual January business meeting of the Indiana Society of Professional Land Surveyors, the following officers were elected for the year 1961:

President—James Dankert, Indianapolis
President Elect—Owen C. Smith, Fort Wayne
Vice President—Nelson L. Prall, Bedford
Secretary-Treasurer—Al Forgey, Brownstown
Executive Secretary (appointed)—Lloyd H. Kemmer, West Lafayette (replaces Kenneth S. Curtis, on leave)

Mississippi Land Surveyors Association *

At an organizational meeting held in Jackson, Miss., June 3, 1961, and with nearly one-third of the land surveyors in the State attending in person, the Mississippi Land Surveyors Association was formed.

Officers were elected as follows:

President—Aubrey L. Hopper, Columbus
Vice President—L. W. Stockstill, Picayune
Secretary-Treasurer—Jack Shults, Rolling Fork.

The first major objective of the new association will be to secure the passage of legislation providing for the registration of land surveyors in Mississippi.

Speakers at the organization meeting were John Tunison, City Engineer, Greenville; O. B. Curtis, Secretary, State Board of Registration

for Professional Engineers; and R. H. Naylor, engineer.

*Based on a photocopy of a clipping from *The Clarion-Ledger*, Jackson, Miss., June 4, 1961, and photocopy of letter to ACSM from Carl Hammerstrom, under date of June 16, 1961.—EDITOR.

The Ontario Institute of Chartered Cartographers

At the Annual General Meeting of the Ontario Institute of Chartered Cartographers, held in Toronto, Canada, early in the summer, the following officers were elected:

President—John A. Haddon
Vice President—Hugh R. Hutchins
Secretary—Herbert S. Cox
Treasurer—Roy B. Robinson
Member of the Board—David F. Jupe
Ottawa Representative—Laurence M. Baker

During discussion following the report of the Education Committee, members present agreed that since little cartographic education was available in Ontario a comprehensive education scheme should be instituted by the O.I.C.C. as soon as practical, having as its base, courses resulting in distinct grades of qualification.

Interest in this organization is now becoming widespread. Although formed primarily to benefit cartographers in Ontario and having members from points spanning the Province, members have been accepted from the United States, Britain, and Ceylon. Communications indicating interest have been received from Australia and New Zealand.

The Secretary's address is: Apt. 8, 2526 Bloor St. W., Toronto, Ontario, Canada.

Illinois Registered Land Surveyors Association

The following notes are based on information contained in *The Illinois Surveyor*, Vol. II, No. II, Second Quarter 1961. —EDITOR

The Spring Meeting of the Illinois Registered Land Surveyors Association was held in Vandalia, at Robbins Motel, Friday, May 12, 1961. The meeting began with a dinner at 6:30 p.m., and forty-seven persons, including wives and guests, were in attendance.

The business meeting began at 8:00 p.m., with Vice President Dwain M. Wallace presiding.

Following the business meeting, Joseph Dees, an attorney from Vandalia, spoke concerning the necessity for members of the legal profession and the surveyors to work in close cooperation.

The meeting adjourned at 10:30 p.m.

Due to circumstances preventing his participation in IRLSA affairs, Wilbur M. Francis formally resigned as president at the meeting on May 12, 1961. By action of the Official Board, on Saturday, May 13, 1961, Dwain M. Wallace was elected president. George Chiebicki was elected vice president, and Willard Flag was elected director, to fill vacancies.

Raymond Hauschild of Gillespie, Illinois, was awarded the 1961 Summer Surveying Camp Scholarship of the IRLSA.

Carroll T. Dunn of Redmon, Illinois, received the 1961 Rayner Surveying Award at the Department of Civil Engineering Awards convocation at the University of Illinois on May 3, 1961.

The Winnebago Chapter of the IRLSA, the sixth chapter in the State, was chartered by the Official Board on May 13, 1961.

Woeber J. Reese, a member of the Black Hawk Chapter of the IRLSA, was elected chairman of the Property Surveys Division, ACSM, at the Annual Meeting in March 1961.

Minnesota Land Surveyors Association

The Minnesota Land Surveyors Association held its 9th annual convention April 13–15, 1961, at the Lafayette Club in Minneapolis Beach.

The MLSA is a component part of the Minnesota Society of Professional Engineers and is also an institutional affiliate of the nationally recognized surveying society, the American Congress on Surveying and Mapping.

Work shops on the application of the Geodimeter and digital computers to land surveying were conducted by Professor Jesse E. Fant, of the University of Minnesota, and Edwin Miller of Technical Advisors, Inc., Ann Arbor, Michigan. Other speakers presenting papers were: Sidney A. Frellsen, Director of Waters, Minnesota Department of Conservation; Frank S. Hemmings, Jr., U. S. Fish and Wildlife Service; A. F. Soucheray, Jr., St. Paul Abstract Company; Ray W. Fassett and Victor H. Hedman, U. S. Forest Service, Milwaukee; Fred Williams, Keuffel & Esser Co., Chicago; Chester A.

Wilson, Stillwater, attorney and former conservation commissioner; Col. William S. Kelley, Jr., member of the Minnesota Board of Registration for Architects, Engineers and Land Surveyors; Elmer J. Peterson, Chief Deputy Surveyor Hennepin County; Ralph Keyes, St. Paul attorney and executive secretary of the Minnesota County Commissioners Association; and John Peters, Minneapolis attorney and chief title examiner, Hennepin County.

Dick Nesbitt, well-known sports commentator, TV personality, and former halfback for the Chicago Bears was the speaker at the Friday evening banquet.

Martin C. Menk, Jr., St. Peter, succeeds Sam Benzing, Jr., Grand Rapids, as president of MLSA for 1961. Other officers elected were: Charles O. Georgi, St. Paul, vice president; C. Donald Coulter. Minneapolis, secretary; Ralph R. Solfield, Richfield, treasurer; Harold Hofstrand, St. Louis Park, Director to M.S.P.E.; and the executive committee members-at-large include Wayne R. McLagan, West St. Paul; Charles D. Hosfield, Owatonna; Peter J. Meyer, Cass Lake; John X. Stark, Crosby; and Donn E. Pepper, Elk River.

—CARLISLE MADSON
Publicity Chairman, MLSA

PARK AERIAL SURVEYS, INC.

Est. 1920

AERIAL PHOTOGRAPHIC & TOPOGRAPHIC SURVEYS

STANDIFORD FIELD LOUISVILLE, KY.

Save with Permanent Copperweld TRADE MARK MARKERS

Can't Rust! thick copper covering molten welded to steel core

- PROTECT your investment in the original survey—and protect yourself from troublesome disputes.
- AT LITTLE COST you can quickly and easily drive Copperweld* Markers and have permanent reference points. Bronze head can be center-punched and stamped for identification. If larger head is needed, a 4" adapter is available.

*Trade Mark

Furnished in any desired length—in multiples of 6 inches. Packed 10 markers to a carton.

CROWN METAL PRODUCTS CO.
WYANO, PA.

Write for Bulletin 144

IT IS NOT TOO EARLY TO BEGIN PLANNING TO ATTEND THE 1962 MEETINGS

SHOREHAM HOTEL
WASHINGTON, D. C.,
MARCH 11–17, 1962

SUBDIVISION CALCULATIONS BY ELECTRONIC COMPUTER

Your job is to engineer the best possible subdivision layout in the form of a well-scaled preliminary. Our job is to furnish calculations that not only are correct but are in a form that you can *verify them without recalculation*. We supply a computer print-out showing every traverse solved in order of their solution. You just read through the print-out noting input data for each traverse and follow our logic through each block.

You send us the preliminary drawing, boundary data and lot requirements. You receive the preliminary with key numbers thereon tying into the computer print-out. The print-out contains length, bearing, departure and latitude (or coordinates) and sine and cosine of bearing of every course; area of lots and complete curve data.

We have calculated some 10,000 lots in the last half year for surveyors and engineers in 20 different states. We invite you to write for our new brochure and to send us your next subdivision for quotation.

JACOBY & ASSOCIATES, INC.

140 ORINOCO DR., BRIGHTWATERS, NEW YORK

Tel: MOhawk 6-8485

Congress News

Colorado Section

The April 4, 1961, meeting of the Colorado Section, ACSM, was held in the Library Auditorium of the Colorado School of Mines, Golden, Colorado, and was called to order by Chairman Louis Soreide at 7:35 p.m. There were 55 persons present—42 members and 13 visitors—despite very disagreeable weather.

Professor F. E. Smiley, Jr., Colorado School of Mines, and President, Rocky Mountain Section, ASP, discussed details of the joint meeting to be held May 27, 1961, at the Air Force Academy. Forty-five people indicated they would attend. Families and friends of the Colorado Section, ACSM, and the Rocky Mountain Section, ASP, were invited to attend. Chairman Soreide indicated that no bus charter was anticipated and that the car pool would probably originate at the Denver Federal Center.

Membership Chairman, Gerald S. Nabors, reported 123 paid-up members of the Section.

Chairman Soreide called attention to the Section's educational program and the firm response it has had—to date, an average of 54 per meeting.

Paul Blake, our representative to the National ACSM Convention in March, gave a comprehensive account of the meetings, lectures, exhibits, and social activities at the convention. Among other things of interest was the discussion of the position of the ACSM on the status and upgrading of land surveyors as professionals.

Chairman Soreide stated that a date is to be set for the review of the constitution of the Section.

Program Chairman Edwin O. Windham introduced Professor F. E. Smiley, Jr., who commented on the National Convention and mentioned the education in geodesy and surveying in Western Europe and a resolution being studied by the Executive Committee, ACSM, for the development of student chapters.

Professor Smiley introduced Mr. Kemp of Keuffel & Esser of Colorado, who gave a very interesting and comprehensive talk on the technological developments in surveying and mapping instruments from the viewpoint of his company. A spirited question-and-answer period followed.

The meeting was adjourned at 9:15 p.m.

A Joint meeting of the Rocky Mountain Section of the American Society of Photogrammetry and the Colorado Section of the American Congress on Surveying and Mapping was held Saturday, May 27, 1961, at the Air Force Academy, Colorado Springs, Colorado. Responsibility for the details of the meeting rested with the Rocky Mountain Section of the ASP, with Professor Francis E. Smiley, Jr., presiding. The Colorado Section, ACSM, headed by Chairman Louis Soreide, assisted in carrying out the details of the program.

At 11:30 a.m., the group witnessed a cadet parade.

At 1:30 p.m. the group assembled at the parking lot at the Academic Building and then paid a visit to the Geography Department of the Academy. Major Ralph Jackson, AFA, lectured on cartography and geography, giving a brief description of the cartographic and navigational procedures in which the cadets are indoctrinated. Approximately 120 persons were in attendance.

The planetarium show, attended by approximately 200 persons, at 2:15 p.m., was literally out of this world. Narrated by Captain William Gibson, AFA, the show dealt with the successful flight of astronaut Commander Alan Shepard and the celestial objects he was in a position to see as he "floated through the air with the greatest of ease."

At 3:30 p.m., Brother B. Austin Barry, President of the ACSM, who had addressed the American Gas Transmission Association, on the value of photogrammetry in the location of transmission lines, in Denver the day before, spoke to an audience of approximately 150 members and guests of the ASP and the ACSM. Among the many things about which he spoke, the most important were: His plea for greater membership in the local Sections, with greater diversification among public and private engineers and surveyors, particularly surveyors; his suggestion that a substantial increase in dues can be anticipated for 1962 ("We take in $5.00 and spend $5.22 per member."); and his suggestion that more support be given to efforts among the several State and Federal agencies to register

professional engineers and land surveyors and maintain their status in the community.

Approximately 130 persons enjoyed a sumptuous feast at the Officers' Club, beginning at 5:00 p.m. Major Frank Marwin of the Air Force Academy welcomed the group to the club. The original arrangements for this dinner had been made by Captain F. R. Bonnano who was transferred away from the Academy shortly before the dinner was held.

Professor Smiley expressed the general opinion as to the value of this type of meeting when he remarked that the cooperation, response, and acceptance of the meeting had been exceptionally good. Warren Ferrin, an ACSM member and land surveyor from Glenwood Springs, Colorado, demonstrated the reaction to this meeting by requesting that six membership applications for ACSM be sent to him at once.

Chairman Louis Soreide of the Colorado Section, ACSM, was recuperating from a recent operation and was unable to attend the meeting.

The meeting was adjourned after the dinner.

We wish to thank Roland W. Moore and Roger Dwyer of the U. S. Geological Survey for assisting Brother Barry in such a way as to make his visit a memorable one.

We also wish to point out that, as of the date of this meeting, the Colorado Section had a paid-up membership of 130, an increase of more than 250 percent over the membership for the previous year.

—Waldo G. Smith
Secretary-Treasurer, Colorado Section

Delaware Valley Section

The first annual meeting of the new Delaware Valley Section of the American Congress on Surveying and Mapping was held April 20, 1961, at the Peacock Gardens restaurant at Valley Forge.

The large turnout of over 80 members and guests was most gratifying to those who had met just a little less than a year ago to determine if there was enough interest in the area to support an active Section.

The original group met on May 20, 1960, and after considerable discussion it was decided that an attempt should be made to form a Section of the ACSM.

The first organizational meeting was held on September 22, 1960, with Robert J. Beaton, Chairman of the Cartography Division, ACSM, as keynote speaker. In attendance at this session were about 75 men and women who represented a large segment of the surveying and mapping people of the Delaware Valley area. Mr. Beaton's fine address emphasized the need for the strengthening of the surveying and mapping professions through the adoption of a strong code of ethics and through greater support of local chapters and programs of the ACSM.

The new Section moved ahead with the election, on October 27, 1960, of the temporary officers and board of directors, who would serve until a charter had been granted. Four of our founders were placed in office. Kenneth L. Pyle, cartographer with the Montgomery County Planning Commission, was elected Chairman, and Thomas J. Hassett, a veteran of over 20 years of surveying and cartographic experience with Aero Service Corporation, was elected Vice Chairman. The Secretary-Treasurer was David B. Witwer, who also is with the Montgomery County Planning Commission, and the Corresponding Secretary was Howard C. Bennett, Supervisor of Mapping and Drafting with the Penn Jersey Transportation Study.

No meetings were scheduled for November or December, due to the Thanksgiving and Christmas holidays and also to give the Board of Directors sufficient time to draw up the constitution and bylaws.

Our January meeting was buried under a 14-inch snowfall as were a couple of subsequent rescheduled meetings. Finally, on February 16, 1961, the new constitution and bylaws were adopted and our petition for charter was signed.

The April meeting, our first as a full-fledged Section, was most successful as an excellent presentation of the growth and development of surveying methods and instruments down through the ages to the modern electronic, distance-measuring devices. Members of the firm of John G. Reutter and Associates in Camden, New Jersey, and of Aero Service Corporation presented the program and afterward answered questions about the Geodimeter and the Tellurometer.

The new officers and board members for the year 1961–62 comprise a very excellent and diversified cross section of the surveying and cartographic fields in this area. The new Chairman is Thomas J. Hassett who has been active from the beginning. Earl J. Applegate, Chief of Surveys with Sherman, Taylor and Sleeper in Camden, is the Vice President. Earl served on the interim board of directors and has contributed much to the success of the new Section. The Secretary-Treasurer is Raymond B. Walsh from Penn Cartographers in Cheltenham, Pa. Ray also brings quite a few years of cartographic experience to the Section. Howard C.

Bennett is again the Corresponding Secretary.

The members of the Board of Directors are: (3-year terms) Kenneth L. Pyle; Alois K. Strobl, Philadelphia City Planning Commission; Sumner B. Irish, Princeton University; (2 year terms) Walter E. Spotts, Reading, Pa.; Arnold J. Kreisman, Aero Service Corporation; (1-year terms) Sidney B. Barnes of Barnes and Holden, New Castle, Del.; and Nicholas I. Vukovich of the Pennsylvania Game Commission in Harrisburg.

—Howard C. Bennett
Corresponding Secretary

Kansas City Section

The first regular meeting of the Kansas City Section, ACSM, was held May 24, 1961, at the Embassy Restaurant on the Country Club Plaza in Kansas City, Missouri. The dinner meeting

Brother B. Austin Barry, President, ACSM, presents a gavel to Dushan Sumonia, Chairman of the new Kansas City Section, ACSM, as Director James Bell looks on.

was arranged to coincide with the visit to the Middle West of ACSM President, Brother B. Austin Barry, F.S.C., who honored this new venture by installing the following officers:

Chairman—Dushan Sumonia
Vice Chairman—John Kerr
Secretary—Mrs. Nancy Ehrlich
Treasurer—Claude Acosta
Editor—Mrs. Eleanor Bennett
Directors—Matt Madden and Larry Wadley

Forty-three members and guests attended the dinner, some coming from as much as 70 miles away. Such enthusiasm predicts a successful future for the new Section.

—Eleanor M. Bennett
Editor

Louisiana Section

The Annual Dinner Meeting of the Louisiana Section, ACSM, was held May 22, 1961, at the International House in New Orleans. One hundred forty members and guests were present.

The guest speaker was Karl S. Landstrom, Director of the Bureau of Land Management, who spoke of recent developments and plans for the future in the various phases of the operations of the Bureau of Land Management. A Bureau film on Alaska was shown.

Other special guests were Donald B. Clement, Bureau of Land Management, Washington, D. C., and John L. Rakin of the New Orleans office of the BLM.

Officers of the Louisiana Section, elected to serve during the year beginning April 1, 1961, are as follows:

Chairman—Guy F. Radley, Jr.
1st Vice Chairman—J. L. Fontcuberta
2nd Vice Chairman—H. G. Truelove
3rd Vice Chairman—Coleman Kuhn
Secretary—R. S. Burnside, Jr.
Treasurer—W. J. LeCompte
Directors (1961–62)—H. G. Sneed, F. P. Lathrop, J. J. Mahoney, and (1961) A. W. Laborde.

—R. S. Burnside, Jr.
Secretary

Members and Guests—Annual Dinner Meeting, Louisiana Section

Left to right, Martin Standard, Program Chairman; Karl S. Landstrom, Director, Bureau of Land Management; F. C. Gandolfo, Jr., Outgoing Chairman; Guy F. Radley, Jr., Chairman; Donald B. Clement, Bureau of Land Management; George Jones; John L. Rankin, Bureau of Land Management; and Robert C. Dayton.

North Carolina Section

A joint meeting of the North Carolina Section, ACSM, and the Property Surveys and Mapping Functional Section of the Professional Engineers of North Carolina was held in Salisbury, N. C., Tuesday evening, May 16, 1961. Ben L. Smith, Jr., Chairman, North Carolina Section, ACSM, presided, and ten members and two visitors were present.

A discussion was held of the proposed second degree of registration for land surveyors. It was generally agreed that legislative action should not be requested until further information about the proposal had been widely disseminated. A motion was carried supporting this point of view.

The Sections jointly endorsed the Uniform Map Law and authorized the Chairman to inform the State Board of this endorsement. Both Sections also agreed that they were willing to help in any way possible to explain the Uniform Map Law throughout the State and included in the letter to the Board endorsing the law a request for information on how they could help.

It was announced that the next meeting was to he held in Greensboro on November 21, 1961, and that among the subjects to be covered was the suggestion that surveyors might benefit from a refresher course similar to the one offered to engineers by the PENC.

—Dale J. Mills
Secretary

Oregon Section

The 1961 Technical Conference of the Oregon Section of the American Congress on Surveying and Mapping was held in Withycombe Hall on the Oregon State University campus at Corvallis, Oregon, in cooperation with the School of Engineering and other city, State and Federal agencies on April 8, 1961.

The meeting began with registration and a pre-conference acquaintance period at 9:00 a. m.

The first part of the scheduled program, an exhibit of Engineering supplies and equipment, had been cancelled due to illness of the person in charge, and a substitute program began at 10:10 after the call to order by State Chairman H. Bruce Schminky.

The movie film, with sound, entitled "Auto U.S.A.", furnished by the Perfect Circle Corporation, was shown. It was significant to highway and urban planning and was received with great interest, as it pointed out the important role that highway and street transporation plays in modern affairs, and it emphasized that failure to provide for the increase in automobile traffic will result in chaos for cities and the nation as a whole.

Fred Jeter, photogrammetric engineer, Oregon State Highway Department, began his lecture at 10:40 a.m. Using a projector and slides, he covered all phases of highway location by use of aerial photographs, covering such subjects as route selection, horizontal and vertical control, land use and occupancy, and topographic mapping. Location mapping from controlled photomosaics was the final subject covered. Mr. Jeter's lecture was very interesting and was well received.

Professor Richard Mengler of the School of Business Administration at Oregon State University, spoke next on the legal aspects of determining rights in property abutting on a body of water. His talk served to explain and to clear up some questions on this very complicated subject. A few of the points covered were Federal and State sovereignty, land rights from English Common Law, State of Oregon 1872 to 1874 grant of overflow lands to upland owners, navigability, State of Oregon repealing grant of overflow lands in 1878, riparian rights, doctrine of appropriations, river beds, docks and wharfs and so on through the subject. I have had considerable to do with the matter of tide and overflow lands and it was my opinion that he covered the most pertinent phases of the laws and the background of water boundaries and rights, even though briefly, in a very informative way.

The group recessed for the luncheon which was held on the campus at the Memorial Union Hall.

We reconvened at 1:20 p.m., with the first part of the afternoon program devoted to the subject of Geological Mapping in Oregon, conducted by Hollis M. Dole, Director of the Oregon Department of Geology and Mineral Industries. Mr. Dole informed us of the Governor's resources committee and subcommittee pertaining to Geological Survey mapping, the percent of the State of Oregon already mapped, and the hopes for a stepped-up program for further mapping. He illustrated his talk with slides and exhibit maps, and spoke in general terms of the mineralized areas of Oregon and economic mining possibilities. One important phase of his talk covered investigation and reservation, through zoning, of adequate sources of rock, sand, and gravel for construction uses, so that cities will not be faced with shortages or exorbitant

transportation costs of such materials.

Mr. Neal, representing Captain Fred Natella of the United States Coast and Geodetic Survey conducted the next part of the program, using two movies, with sound, entitled (1) TIDES AND CURRENTS and (2) SURVEYORS AT WORK. The films and lecture were greatly appreciated and gave the group a better understanding of the work of the Coast and Geodetic Survey and he informed us of the availability of horizontal and vertical control information.

The St. Johns Renewal Plan, with slide illustration, conducted by Lloyd T. Keefe, Planning Director, City of Portland, Oregon, was the next subject. Mr. Keefe demonstrated what can be done to renew old land-use areas; change antiquated traffic arteries; and to more effectively insulate schools, parks, and homesite areas from industrial plants. He proved that determined effort and planning can change and correlate land uses by municipalities to correct blighted conditions due to conflict of use.

The program was completed at 3:40 p.m. and Chairman Schminky called the meeting to a close.

The Board of Directors of the Oregon Section, thereafter, met briefly to formulate plans for the next annual meeting to be held sometime in September at a time and place to be announced later.

In closing it was observed that 63 persons registered for the conference, and about 20 others came in for part of the lectures and demonstrations.

—F. E. WAGGONER
Secretary-Treasurer

Southern California Section

The following is based on information in the June 1961 *News Letter* of the Southern California Section, ACSM, a photocopy of which was received June 17, 1961. —EDITOR

The ACSM-sponsored field day was held on the U.C.L.A. campus June 17, 1961, beginning at 9:00 a.m.

The County of Los Angeles provided a survey squad, proficient in tape calibration, to demonstrate and answer questions concerning this important function.

There were demonstrations of communication by means of field receivers and transmitters, with a question-and-answer period devoted to this subject.

Measuring instruments were on display, and those present were urged to participate in discussions concerning their operation.

A special feature of the program was the display and discussion of various types of survey monuments used by government agencies and private practitioners.

A drawing for door prizes was held at 2:00 p.m.

Texas Section

The Texas Section, ACSM, held its quarterly meeting April 7, 1961, with a dinner at the Del Webb Hiway House, Houston, Texas. Eighty-four members and guests were present.

Chairman V. A. Walston reported on the Annual Meeting of ACSM and ASP in Washington, March 19–25, 1961.

Frank Smith, immediate past president of the Texas Surveyors Association, announced the forthcoming annual meeting of that group to be held in Austin, Texas, October 23–26, 1961. The Texas Section, ACSM, is also a sponsor of this meeting.

Joe Hicks, immediate past Chairman, Texas Section, ACSM, reported on the activities of the Property Surveys Division at the ACSM annual meeting.

C. A. Tannahill, President of the Gulf Coast Chapter, TSA, gave a brief summary of a proposal to enlist the financial assistance of the City of Houston for the "Establishment, Re-establishment, and Maintenance of an Adequate and Permanent System of City Reference Monuments." The proposal has the endorsement of the Engineers' Joint Council of Houston. At the suggestion of Chairman Walston, the Texas Section, ACSM, also endorsed the proposal.

J. E. Windham, Program Chairman, introduced the principal speaker of the meeting, Lester C. Higbee, Vice Chairman of W. & L. E. Gurley Company, Troy, N. Y., and President of Precision Instruments, Inc., Troy, N. Y. Mr. Higbee spoke on "Engineering Instruments Here and Abroad." He gave many historical facts on the development of various survey instruments by firms engaged in their manufacture. The speaker was critical of the lack of support of the U. S. Government toward domestic instrument makers in developing new ideas and instruments in this country. There were many surveyors present who remembered that Mr. Higbee acted as Moderator in the formation meeting of the Texas Section in Houston the latter part of 1950.

Raymond Sargent of the Raymond Sargent Company, Clifford King of Southern Blueprint

Company, and Dick Berry of Ridgway Company furnished various types of instruments for demostration purposes.

Tom Dillion, President of the Texas Surveyors Association was unable to be present.

The second quarterly meeting of the Texas Section, ACSM, was held in the Lamar Hotel, Houston, Texas, June 23, 1961, with Chairman Virgil A. Walston presiding and with 43 members and guests present.

Mr. Frank Spearey, Surveyor and Forester, of Jacksonville, Texas, spoke on "Forestry and Surveying." Mr. Spearey accented his talk with slides showing the growth habits of the various trees of east Texas, their life expectancy, and the proper way to mark them so as to obtain the longest life for the marks *and* the trees.

J. S. Boyles, member of the Board of Registration for Registered Public Surveyors of Texas, showed a number of slides of trees marked in 1838 and found standing in recent years.

Homer A. Ratchford, Henry J. Fernandez, and James H. Tison were introduced as new members.

Chairman Walston announced the resignation of Paul Wiseman as Secretary, due to his new assignment as Regional Engineer with Atlantic Refining Company in Midland, Texas; and the resignation of Jack Windham as Program Chairman because of his transfer to other duties by his company. By its action of June 13, 1961, the Executive Board elected Hodge E. Mason to fill the unexpired term as Secretary, and approved the selection of Leon A. Dye to fill the unexpired term as Chairman, Program Committee.

Chairman Walston emphasized that part of the work of the Executive Board's meeting of June 13, 1961, relative to adoption by the Board of a resolution to amend Section 4, Article II of the Bylaws (Election of Officers and Directors) to instruct the Nominating Committee to nominate *one* candidate for each office and *two* or more candidates for each directorship to be filled. The notice of the proposed amendment is scheduled to be mailed to the membership two weeks prior to the third quarterly meeting of 1961.

Chairman Walston advised the Executive Board on June 13th that an exhibit booth for the Texas Section, ACSM, would be provided by the Texas Surveyors' Association at its annual meeting in Austin, Texas, in October 1961.

—FORREST DANIELL
Section Editor

Utah Section

The second regular meeting of the Utah Section, ACSM, was held April 27, 1961, at the University of Utah. The meeting was called to order at 7:30 p.m., by Chairman Bryner. There were 25 members and guests present.

A motion was made by Robert Jones and seconded by Douglas Brammer that an annual award be given to the student selected by the Civil Engineering Faculty of the University of Utah as the most outstanding in the field of surveying and mapping. The award to consist of a two-year subscription to SURVEYING AND MAPPING and a certificate of achievement from a suitable plaque to be given the University of Utah. Costs of the plaque and subscription to be borne by the Utah Section, ACSM. The motion was carried unanimously.

The chairman of the committee appointed at the meeting of February 23, 1961, to look into the matter of the establishment of a Utah Information Center for Surveying Monuments reported that a list of addresses had been received from the Coast and Geodetic Survey to which that agency makes automatic distribution of control data. Several joint meetings were held with representatives of the Utah Council of Land Surveyors. It is now proposed to send a questionnaire to each address on the C&GS list to find out what the several States are doing and to determine the best approach for Utah to make. The proposal was approved and the questionnaire, as of April 30th, was being typed and mailed.

Professor Bryner announced that, as an interim measure and to initiate action, he has secured the agreement of the State Highway Department to require that contractors furnish on 8×11 vellum any survey data obtained with highway funds. These data will then be forwarded to Professor Bryner's office, where they will be catalogued, stored, and procedures for dissemination established.

Herb Lee introduced Wallace R. Woodbury, who spoke on "Legal Aspects of Land Surveying." Because of the interest aroused and the large number of specific questions raised, the meeting did not adjourn until well after 10:00 p.m.,—about an hour later than usual.

On May 12, 1961, the Civil Engineering Department of the University of Utah held its first Annual Student Awards Banquet devoted to the encouragement of scholastic achievement and professionalism. The principal speaker

was Utah's Governor George D. Clyde—a civil engineer.

Included with the eight awards presented was the First Annual Surveying and Mapping Award presented by the Utah Section, ACSM. The award consisted of the student's name on a wall plaque and a two-year subscription to SURVEYING AND MAPPING. The specification read: "Mr. Gordon Smith, for Scholastic Achievement and a special interest in Surveying and Mapping."

—I. E. RITTENBURG
Secretary

Professor C. G. Bryner (*left*), Chairman, Utah Section, ACSM, and Gordon Smith (*right*), recipient of the 1961 Utah Section Award.

Hawaii Section*

James L. Bell, a Director of the ACSM and Past Chairman of the Property Surveys Division, ACSM, attended the Governors convention held in Honolulu June 23–25, 1961, and reports that he made contact with Chairman Henslee Towill of the Hawaii Section, meeting with him and the Section's advisor to the Property Surveys Division, Walter P. Thompson. Many matters concerned with surveying and mapping in general and property surveys in particular were discussed.

Director Bell said that learning of the particular work going on and a few of the problems in Hawaii was very enlightening. He urges continued close communication between ACSM and its distant Section, and that in addition to attending the annual convention participation by the Section in the affairs of ACSM by airmail correspondence as much as possible would be in the best mutual interest to the profession.

* The above was abstracted from correspondence.

Topography Division*

A meeting of the Topography Division, ACSM, was called to order by Chairman David Landen at 8:00 p.m., July 12, 1961. The meeting was held in the conference room of the Old Dominion Building, 1109 N. Highland St., Arlington, Va. Present were: Landen, Dunich, Kowalczyk, Hughes, Hayes, Thompson, Buckey, and Swasey.

Mr. Kowalczyk suggested that presentation of awards at the Annual Meetings of the ACSM be programed to precede the address by the keynote speaker, to accord the recipients the respect and honor due them. All agreed, and Mr. Kowalczyk was instructed to prepare a resolution, to be signed by the members of the committee, for forwarding to the General Chairman of the 22nd Annual Meeting.

Director Franklin Van Zandt's resignation, necessitated by his two-year assignment in Colombia, was accepted and Raymond Mays, Chief, Maps and Models Division, Army Map Service, will fill out the unexpired portion of the three-year term as Director.

Edmund Swasey was elected Secretary of the Topography Division and immediately assumed the duties of the position.

Chester Kowalczyk was appointed Vice Chairman of the Division.

Director Tom Hughes was appointed as Program Chairman for the Division in connection with the 22nd Annual Meeting.

The Division's new nominating committee is as follows: Frederick K. Hayes, *Chairman*, Army Map Service; Chester Kowalczyk, U. S. Navy Hydrographic Office; and Jack Pumpelly, U. S. Geological Survey. A new chairman and two new directors are to be elected.

The chairman appointed M. M. Thompson and C. W. Buckey to draw up a resolution favoring a change in map accuracy specifications, in line with the 1960 symposium, for eventual presentation to the ACSM membership.

* These notes are based on minutes of the meeting supplied to Executive Secretary Dix by Edmund Swasey, Secretary, Topography Division.
—EDITOR

Deaths

Word has been received at the Central Office, ACSM, of the sudden death of **Emil E. Van Brunt** on April 29, 1961, as a result of a heart attack.

Jack Jordan Ammann, president of Jack Ammann, Inc., died at his home in San Antonio, Texas, on June 14, 1961.

He was born in Washington, D. C., October 26, 1908, and attended the Kemper Military School, Boonville, Mo., 1925–28; received the B.B.A. degree from the University of Texas in 1932; and undertook special post graduate studies at St. Mary's University in San Antonio.

Mr. Ammann served for a number of years as a member of the Board of Governors of St. Mary's University and was a past chairman of the Education Committee of that Board. It was largely through his efforts that St. Mary's University established its engineering department, from which six young men received this year their Bachelor of Science degrees in Industrial Engineering.

He entered the field of aerial surveys, shortly after graduation from the University of Texas, as a partner of Kargl Aerial Surveys. In 1940 he purchased the interests of all partners and the name of the company was changed to Jack Ammann Photogrammetric Engineers. In 1954, the company was incorporated and Mr. Ammann became its President and Chairman of the Board of Directors. The name of the company was again changed in 1960, to Jack Ammann, Inc.

Mr. Amman was active in civic and social matters as well as in technical society affairs. He held membership in the Association of Professional Photogrammetrists, American Society of Photogrammetry, American Congress on Surveying and Mapping, Texas Surveyors Association, American Institute of Industrial Engineers, and was a Registered Professional Engineer.

Personals

Draper K. Sutcliffe is president of Sutcliffe and Associates. In addition to their offices in Randallstown and Frederick, Md., this organization has recently opened another office in Laurel, Md.

Lyman D. Lynn, who furnishes the copy for the "Surveying and Mapping Literature" department in SURVEYING AND MAPPING, recently received a letter expressing the appreciation of a firm of attorneys for his help in locating certified copies of maps of York County, Va., and the York River, which enabled the attorneys to successfully present their case.

G. Brooks Earnest, President of Fenn College in Cleveland, is the official nominee for president (1962) of the American Society of Civil Engineers.

G. W. (Buck) **Herzog,** first Chairman, Texas Section, ACSM, a member of the Board of Direction, ACSM, in 1953–54, and Vice President, ACSM, in 1956, has retired from his position as Supervisor, Drafting-Survey Division, Shell Oil Company, Houston, Texas, after 36 years of service with that company. He joined the Shell organization as a draftsman in 1925 and has held positions of increasing responsibility as the years passed. Mr. Herzog is a graduate of Kansas State College and Paris (France) University; served in France during World War I; in the Texas Defense Guard, air branch and Civil Air Patrol, during World War II, having held private pilot's license for more than twenty years; and is active in various civic and professional organizations.

Clyde Armstrong, general convention chairman, for the Regional Meeting, ACSM, in Phoenix, Arizona, in October 1961, had to resign from that post, and **Carl Chadwick** was appointed as his successor.

Professor **Kenneth S. Curtis** has been granted a sabbatical leave from Purdue University during the academic year 1961–62 and plans to undertake advanced study in the Department of Geodetic Science at the Ohio State University.

Floyd W. Hough, President of Geonautics, Inc., has been elected to a three-year term as President, Section of Geodesy, American Geophysical Union.

Helmuth Bay, for 19 years the Washington representative of Rand McNally & Company, retired on July 1, 1961, after 38 years service with that company. Mr. Bay has been active in ACSM affairs for many years. He served as Vice President in 1950; as chairman of the Constitution Committee in 1949; as chairman of the Publications Committee from January 1948 to June 1951; was chairman for the 14th Annual Meeting in March 1954; and has also served on nominating committees, the special

committee on map scales, etc. As of July 1, 1961, **Richard R. Randall** becomes the Washington representative of Rand McNally & Company, with his office in Room 1104 National Press Building, Washington 4, D. C.

Professor **Robert P. Witt,** Oklahoma State University, was appointed staff consultant to the Topographic Division of the U. S. Geological Survey for a one-year period beginning in June 1961, to assist primarily with recruiting and training engineers, aides, cartographers, and cartographic technicians.

Horton Dennis and his firm, Horton Dennis and Associates, Seattle, Washington, have recently been named the sales representative in the State of Washington for the Aerial Surveys Division of the Fairchild Camera and Instrument Corporation. Mr. Dennis' firm was founded in 1955 and practices engineering and surveying throughout the State.

Brother **Amandus Leo,** F.S.C., retired this spring after 31 years as dean of the School of Engineering at Manhattan College. He will continue at the College as a faculty member in the Department of Mathematics and has just been re-elected president of the Association of Engineering Colleges of New York State for 1961–62. During his tenure as Dean, Manhattan College grew from a small college with less than 200 students in the engineering department (where major programs were offered only in civil engineering and architecture) to a college that this year graduated nearly 200 students who received degrees in civil, chemical, electrical, and mechanical engineering. Brother Leo is a licensed professional engineer in New York State and a fellow of the American Society of Civil Engineers and the New York Academy of Sciences. He is chairman of the engineering scholarship committee of the New York State Society of Professional Engineers, an advisor on engineering curriculum to Gannon College in Erie, Pennsylvania, and is chairman of the advisory committee on engineering curriculum at Catholic University of America in Washington, D. C. Brother Leo was one of those present at the Iowa State College summer surveying camp in 1938 when plans were first made for a national congress on surveying and mapping.

Franklin K. Van Zandt has resigned as Director, Topography Division, ACSM, because of his assignment for a two-year period to work in Colombia for the International Cooperation Administration. **Raymond R. Mays,** Chief, Division of Maps and Models, Army Map Service, will succeed Mr. Van Zandt as a Director of the Topography Division.

Commander **Carl A. Egner,** U. S. Coast and Geodetic Survey (Retired) has been awarded the Philippine Legion of Honor in the degree of Officer for exceptionally meritorious and significant services rendered to the Philippine Government from January 15, 1917, to March 15, 1945.

Official U. S. Navy Photograph

Left to right, Dr. J. W. Joyce, National Science Foundation; Edward E. Goodale, USARP Representative, New Zealand; Rear Admiral H. Arnold Karo, Director, U. S. Coast and Geodetic Survey and then President, ACSM, upon the arrival of Dr. Joyce and Admiral Karo at Christchurch International Airport, New Zealand, from NAF McMurdo Sound, Antarctica, November 6, 1960.

Rear Admiral **Charles Pierce,** Deputy Director, Coast and Geodetic Survey, retired from that position on July 31, 1961. Captain James C. Tison, Assistant Director for Administration, has been picked by President Kennedy to move up to the position of Deputy Director, with the rank of Rear Admiral, to fill the vacancy created by the retirement of Admiral Pierce.

Captain **John H. Brittain,** who, until early in July, had been "wearing two hats"—Chief, Division of Geodesy, and Assistant Director for Physical Sciences—was succeeded as Chief, Division of Geodesy, by Captain **Franklin R. Gossett.** Then, on July 31, 1961, Captain Brittain retired from his position as Assistant Director for Physical Sciences, Coast and Geodetic Survey.

APPLICATION FOR MEMBERSHIP

I am interested in surveying and mapping and hereby apply for membership in the American Congress on Surveying and Mapping. I enclose $5.00 (U. S. and Possessions), $6.00 (Foreign) in payment of annual dues.

Name (Please type or print) .....

.....

Mailing Address .....

.....

Occupation and Organization .....

.....

Branches of surveying and mapping preferred .....

.....

Reference. If registered, please indicate .....

.....

Applicant's Signature ..... Date .....

(Send to: Chairman, Membership Committee,
Room 430 Woodward Building, 733 15th Street, N.W., Washington 5, D. C.)

Reprints of Articles

Reprints in quantities of 50 or more may be obtained of any article appearing in this issue. Orders must be placed with the Editor-in-Chief, Howard S. Rappleye, 6712 4th St., N.W., Washington 12, D. C., not later than 3 weeks after publication. Authors who wish reprints of their articles may so indicate when manuscripts are submitted. Approximate prices of reprints follow:

Without Covers

Number	*4 pp.*	*8 pp.*	*12 pp.*	*16 pp.*	*20 pp.*	*24 pp.*	*Covers**
50	$14.20	$23.90	$36.40	$38.70	$51.10	$60.80	$12.10
100	$14.80	$25.00	$38.10	$40.40	$53.40	$63.60	$14.50
Add'l 100s	$ 1.30	$ 2.20	$ 3.40	$ 3.40	$ 4.70	$ 5.70	$ 4.80

* Heavy paper cover—over and above the cost of reprints without covers.

NEW MEMBERS

AKERLEY, Edward C., 5025 Harper Rd., Solon 39, Ohio—Designer, Erie-Lackawanna Railroad Co.

ALLEY, Ronald E., R. F. D. 1, Bar Harbor, Maine—Surveyor

ALLISON, Fred C., 400 N. Boundary St., Williamsburg, Va.—Assistant City Engineer

ALLSOP, M. L., P. O. Box 26, Akwatia, Ghana—Land Surveyor, Diamond Mining Co.

AMSTERDAM, Lewis L., 116 N. 7th St., Philadelphia 6, Pa.—Map Publisher, G. M. Hopkins Co.—Franklin Survey Co.

APPOLDT, Walter, 1416 W. Main St., Norristown, Pa.—Vernon Graphics of Pennsylvania, Inc.

ARELLANES, Henry V., P. O. Box 6301, Albuquerque, N. Mex.—Draftsman

ARMSTRONG, Carl H., 111 Sunset St., Greenville, Tenn.

ARNOLD, Charles F., 5 White Horse Rd., Hingham, Mass.—Civil Engineer, Town of Weymouth

AYRES, Tommy E., Route 2, Box 195A, Walterboro, S. C.—Surveyor

BABB, Robert E., Jr., 11 Beverly Rd., Charleston 50, S. C.—Construction Engineer, South Carolina Electric & Gas Co.

BAILEY, Frank J., 7048 Brecksville Rd., Independence, Ohio—Surveyor-Engineer, Cleveland Metropolitan Park District

BALDWIN, R. Stuart, P. O. Box 5601, Norfolk, Va.—Partner, Baldwin & Gregg

BALLARD, S. D., 703 Mogford St., Midland, Tex.—Chief Surveyor, Land Department, Shell Oil Co.

BARBER, Paul, 803 Sklar Bldg., Shreveport, La.—Land Surveyor

BATEMAN, Harry, 7210 Rogers Ave., Pennsauken, N. J.—Surveyor, Sherman, Taylor & Sleeper

BATES, A. James, Room 242, Building 40, Denver Federal Center, Denver, Colo.—Project Engineer, Bureau of Public Roads

BATTAGLIA, Mrs. Mary E., 5420 Galena Place, N.W., Washington 16, D. C.—Cartographic Compilation Aide, U. S. G. S.

BAUER, George F., 1004 Brooke Rd., Capitol Heights 27, Md.—Cartographic Supervisor, U. S. Navy Hydrographic Office

BAUM, Irving W., 930 Delaware Ave., Redlands, Calif.—Assistant Highway Engineer

BEAGLE, Charles W., 102 Nassau Ave., South Plainfield, N. J.—Municipal Engineer, New Providence, N. J.

BEBERMEYER, Garnet, 8345 S. Laclede Station Rd., Affton 23, Mo.—Cartographer, A. C. I. C.

BEEDLE, Wallace E., 29 Marquette Drive, Rapid City, S. Dak.—Land Surveyor, Flahart and Dittman

BENFELL, Vincent S., 1910 19th St., Golden, Colo.—Chief, Geodetic Unit, Topographic Division, Rocky Mountain Region, U. S. G. S.

BENNETT, George N., 2412 Gordon Rd., Regina, Saskatchewan, Canada—Land Surveyor

BENSON, Karl G., 1976 Quesada Ave., San Francisco 24, Calif.—Computer-Draftsman, Carl E. Kirker

BERRY, Cecil G., P. O. Box 176, Inverness, Fla.—Land Surveyor

BEST, Robert E., 536 Creekside Rd., Pleasant Hill, Calif.—Assistant Engineer, California Division of Highways

BINGHAM, Charles J., 412 N. 21st St., Camp Hill, Pa.—Vice-President, Capitol Engineering Corp.

BLAKE, Gilbert T., 12503 Astor Ave., Cleveland 35, Ohio—Party Chief, Cuyahoga County Engineer

BOLAND, Henry J., 1441 Welton St., Denver 2, Colo.—Consulting Engineer

BOOSE, James A., 90 Ivory Foster Rd., Owego, N. Y.—Research Analyst, International Business Machines Corp.

BOWNE, Sidney B., Jr., 161 Willis Ave., Mineola, N. Y.—Civil Engineer

BRADY, Byron McNeil, 128 S. Ward St., Elkhart, Ind.—Surveyor, Brady Land Surveying

BRANNAN, James E., 22815 Ocean Ave., Torrance, Calif.—Chairman, Barclay Engineering Co., Inc.

BRENN, M. O., 4121 S. "H" St., Bakersfield, Calif.—Surveyor, Richfield Oil Corp.

BRINSKY, Ronald P., 4951 11th Ave., Sacramento 20, Calif.—Party Chief, State of California

BROWNELL, Robert P., 844 Marshall Ave., Webster Groves 19, Mo.—Cartographer, A. C. I. C.

BUCHANAN, James A., 2510 W. 18th St., Panama City, Fla.—Land Surveyor

BUNTIN, Clyde O., Jr., 2802 N. Woodland St., Tucson, Ariz.—Party Chief, Gene Anderson Engineering Co.

BURK, James, 1690 Vance St., Lakewood, Colo.—Party Chief, Huffstutler & Co.

BURTON, Leslie, 735 N. 3rd St., Montrose, Colo.—Forster, U. S. Forest Service

CAMPBELL, Robert C., 4003 W. Eldorado Place, Denver 19, Colo.—Borehole Survey Engineer, Eastman Oil Well Survey Co.

CAPELL, R. L., Jr., 112 Delmar Lane, Lafayette, La.—Land Surveyor, John E. Chance & Associates

CAPODANNO, Albert T., 278 Lighthouse Ave., Staten Island 6, N. Y.—Louis W. Reuter, Jr., Inc.

CARLSON, Carl R., P. O. Box 202, Stowe, Vt.—Land Surveyor

CATO, Willie G., Jr., 7111 N. W. 22nd Court, West Hollywood, Fla.—Land Surveyor

COLEMAN, Walter D., U. S. Geological Survey, Denver Federal Center, Building 25, Denver, Colo.—Cartographer

COLETTI, Victor F., 125 Bunker Hill Lane, Quincy, Mass.—Civil Engineer

COLLINS, George F., P. O. Box 562, Southport, Conn.—Partner, Gill-Collins Associates

CORNELIUS, Jack, P. O. Box 133, Rolla, Mo.—Civil Engineer, U. S. G. S.

COSTELLO, James P., General Electric Co., Room 43, Northern Lights, Syracuse, N. Y.—Engineer

CREWE, Richard H., 38 Cromer Place, Weston, Ontario, Canada—Land Surveyor, Department of Public Works, City of Toronto

CUELLAR, Heberto O., 4102 King Krest Drive, San Antonio 19, Tex.—Cartographer, Army Map Service

CURD, Rollin C., 1926 N. Howard St., Grand Island, Nebr.—Land Surveyor, U. S. Bureau of Reclamation

CURRENS, James M., 4312 W. 74th St., Prairie Village, Kans.—Cartographic Supervisor, Army Map Service

DANIELS, William, P. O. Box 2180, 1002 TNB, Houston 1, Tex.—Supervisory Engineer, Humble Oil & Refining Co.

DAVIDSON, Donald A. 222 Hialeah Ave., San Antonio 9, Tex.—Cartographic Technician, Army Map Service

DAVIES, K. J., 218 Coopers Camp Rd., Ashgrove, Brisbane, Australia—Land Surveyor

DAVIS, Frederick M., 2224 S. Newton St., Denver, Colo.—U. S. G. S.

DELLA-MORETTA, Leonard B., 402 S. 6th St., Escanaba, Mich.—Forest Engineer, U. S. Forest Service

DERAFFELE, Florenz T., 156 4th St., New Rochelle, N. Y.—Vice-President, Allied Map Co., Inc.

DIEHL, William S., Municipal Bldg., Rocky Mount, N. C.—Draftsman, Engineering Department, City of Rocky Mount

DIXON, Donald Joe, 10736 Blue Ridge Extension, Kansas City 34, Mo.—Photogrammetric Aid, Army Map Service

DODSON, Dan L., 228 North Park, Bellefontaine, Ohio—Surveyor, Logan County Engineering Dept.

DOOLITTLE, H. J., 53 Briarwood Rd., West Hartford, Conn.—Doolittle Brothers Engineering Services

DOUGHERTY, Jack N., 700 Gaybar Ave., West Covina, Calif.—Party Chief, Los Angeles County

EASTER, Jack, P. O. Box 622, Littleton, Colo.—Surveyor

EATON, John H., 1416 E. 8th St., Bend, Oreg.—Civil Engineer, City of Bend

EDMONSON, Park D., 760 Chamberlain Place, Webster Groves 19, Mo.—Cartographer, A. C. I. C.

EHRLICH, Mrs. Nancy M., 1810 Vermont St., Independence, Mo. — Cartographic Compilation Aid, Army Map Service

ENRICO, Michael, P. O. Box 386, Morenci, Ariz.—Transitman, Phelps Dodge Corp.

EPPS, Kermit R., 6015 N. Detroit St., Portland, Oreg.

ESPY, G. B., Jr., P. O. Box 454, Jackson, Ala.—Owner, Espy Survey & Map Service

EWING, E. Raymond, 146 Camp Council Rd., Phoenixville, Pa.—Party Chief, Earl R. Ewing

EWING, Earl R., 231 Washington Ave., Phoenixville, Pa.—Surveyor

FEIGHT, Richard K., 5633 N. 63rd Ave., Glendale, Ariz.—Party Chief, Maddock & Associates

FEINGOLD, Morton, 1207 N. Orange Grove Ave., Los Angeles, Calif.

FISHER, Clarence, Battleboro, N. C., Engineer and Land Surveyor

FRAZIER, Evabelle M., 8407 Highland St., Kansas City 31, Mo.—Cartographic Draftsman

GAETA, Anthony J., 1237 Rhawn St., Philadelphia 11, Pa.—Civil Engineer, Pennsylvania Department of Highways

GARRATY, John W., Damon & Foster, Chester Pike and High St., Sharon Hill, Pa.—Surveyor

GAUSE, Kermit, 5846 Pierce St., Arvada, Colo.—Draftsman, Robert F. Harrison & Associates, Inc.

GEARY, Francis C., R. F. D. 2, Box 450, Clinton, Md. —Cartographer, U. S. Navy Hydrographic Office

GETTYS, Richard F., 6011 Hawthorne St., Cheverly, Md. — Cartographer, U. S. Navy Hydrographic Office

GILLESPIE, W. E., Route 2, Box 18, Vale, Oreg.—County Surveyor, Malheur County

GILLILAND, C. A., Route 1, Box 1024, Morenci, Ariz.—Rodman, Phelps Dodge Corp.

GILLILAND, Donald P., 6237 S. 10th St., Phoenix 40, Ariz.—Party Chief, Maddock & Associates

GOEBEL, Hereld C., P. O. Box 44, Gray Summit, Mo. —Cartographer, A. C. I. C.

GOMOLKA, Eugene G., 183 Millbrook Drive, Levittown, N. J. — Director, Cadastral Services, Aero Service Corp.

GOODWIN, Harry W., 2223 Packard Rd., Ann Arbor, Mich.—Project Engineer, McNamee, Porter and Seeley

GRANGER, Leonard R., 625 Hardesty St., Kansas City, Mo. — Assistant Chief, Kansas City Field Office, Army Map Service

GRAVES, Robert W., 727 Mohawk, St., Lewiston, N. Y.—Survey Supervisor, H. R. Feldman, Inc.

GREER, James E., Federal Center, Denver, Colo.—Cartographic-Photogrammetric Aid, U. S. G. S.

GRIFFITH, John R., 5880 N. Marshall St., Philadelphia, Pa.—Project Engineer, Aero Service Corp.

GRUBE, Mary Jo, 207 E. Forest St., Lee's Summit, Mo.—Cartographer, Army Map Service

GRUBER, Miss Doris J., 9827 W. 53rd Ave., Arvada, Colo.—Cartographer, U. S. G. S.

GUBAR, Miss Valentina, 723 N. 5th St., Philadelphia 23, Pa. — Cartographic Aid, Montgomery County Planning Commission

GUNN, William F., Buce & Gunn, Inc., 1401½ N. Zangs St., Dallas 3, Tex.

HAIGHT, Richard L., P. O. Box 861, San Andreas, Calif.

HALES, Forrest J., 1490 N. Ivy St., Coquille, Oreg. —Surveyor and Forester

HALL, Glenn, 2100 Hoyt St., Denver 15, Colo.—Cartographer, U. S. G. S.

HAMILL, James L., 202 City Hall, Portland 4, Oreg. —Assessment Analyst, City of Portland

HARDEE, Joseph E., 410 Armfield Ave., Asheboro, N. C.—Engineer, Moore, Gardner & Associates

HARDISON, Lionel M., 3407 22nd St., S.E., Washington 20, D. C.—Cartographer, U. S. Navy Hydrographic Office

HARLAND, Delbert D., P. O. Box 2390, Sacramento 11, Calif. — Party Chief, California State Division of Beaches and Parks

HARRIS, Ronnie P., 7161 W. 52nd Ave., Arvada, Colo.—Engineer, Jefferson County Planning Dept.

HARTKE, Charles E., Nussbaumer, Clarke & Velzy, Inc., 327 Franklin St., Buffalo 2, N. Y.—Manager, Survey Department

HARVIN, John W., Jr., 355 E. Adams St., Jacksonville 2, Fla.—Land Surveyor

HASTINGS, William K., P. O. Box 2180, Houston 1, Tex.

HAWKINSON, Lenton C., 7403 Cooper Chapel Rd., Louisville 19, Ky. — Supervisor, Photogrammetric Mapping, Park Aerial Surveys

HECKER, Gregory J., 713 W. Prescott St., Salina, Kans.—Land Surveyor

HEISE, Eugene, 1131 Columbine St., Denver, Colo.—Cartographic Draftsman

HENNINGSEN, Joe Neis, U. S. Geological Survey, Building 25, Denver Federal Center, Denver 15, Colo.—Civil Engineer

HENRICKSON, Gordon H., 6107 S. E. Carlton, Portland 6, Oreg.—Surveyor, A. J. Paris

HENSEN, Ronald J., Fort Lewis A & M, Durango, Colo.—Instructor of Engineering

HICKS, R. P., 229 N. Bowie St., Jasper, Tex.—Surveyor, Southwestern Settlement & Development Co.

HILL, Harold A., 827 Glenmere Rd., Fairfax, Va.—Cartographic Technician, U. S. G. S.

HOGG, James R., 11005 E. 36th St., Independence, Mo.—Supervisory Cartographer, Army Map Service

HOLLY, Donald H., 3215 Sandy Place, Carlsbad, Calif.—Surveyor

HOLT, Clarence F., 9023 Volta St., Lanham, Md.—Cartographer, U. S. Navy Hydrographic Office

HOLZMACHER, Robert G., 500 Broad Hollow Rd., Melville, N. Y.—Civil Engineer

HONEYCUTT, Auther H., P. O. Box 626, New Orleans 7, La.—Associate Engineer, Humble Oil & Refining Co.

HOWLAND, R. L., 1841 Castro Way, Sacramento 18, Calif.—Civil Engineer

HOWLETT, Francis W., Route 2, Box 69-J, Clinton, Md. — Cartographer, U. S. Navy Hydrographic Office

HUCKABY, Billy Gene, 1717 W. Highland St., Santa Ana, Calif.—Surveying Technician, Orange County

HUGHES, Dale Raymond, 3840 Ingalls St., Wheatridge, Colo.—Cartographic-Photogrammetric Aid

HUPP, Wesley S., 9135 W. 4th Place, Lakewood 26, Colo.—Supervisory Cartographic Technician, U. S. G. S.

HYCHKO, John T., 98 Newport Ave., Alden, Nanticoke, Pa.—Instructor, Pennsylvania State University

IGATA, Tadashi, 7625 Vallejo St., Denver 21, Colo. —Cartopraphic Technician, U. S. G. S.

IRWIN, Vivian P., 1027 Pentz St., Bakersfield, Calif. —Draftsman, Kern County Surveyor

JOHNSON, Edgar N., P. O. Box 294, Flora, Ill.—Engineer and Surveyor, Private Consulting Practice

JOHNSON, James A., P. O. Box 212, Tewksbury, Mass.—Civil Engineer, J. A. Johnson & Associates

JOHNSON, Lester V., 2309 Wilson Blvd., Arlington 1, Va. — Consulting Engineer, Lester V. Johnson Associates

JONES, Charlie, Jr., 334 19th St., N.E., Washington 2, D. C.—Cartographer, U. S. Navy Hydrographic Office

JONES, J. Walter, Jr., 307 Broad St., South Boston, Va.—Land Surveyor

JORDAN, Eugene M., 949 Maple St., Tempe, Ariz.—Party Chief, Maddock & Associates

JORGENSON, Paul E., 681 Miller Court, Lakewood, Colo.—Party Chief, Falcon Air Maps Co.

KAPLAN, Joseph R., 210 E. Courtland St., Philadelphia 20, Pa.—Geophysics Department, Aero Service Corp.

KELLER, Wallace P., Hancock Bldg., Niagara Falls, N. Y.—Consulting Engineer

KENWORTHY, Walter S., 604 Bradley Place, Lafayette Hills, Pa. — Consulting Engineer, Franklin & Lindsey

KERR, John C., 11905 E. 43rd St., Kansas City 33, Mo.—Cartographic Aid, Army Map Service

KIBORN, Wm. R., P. O. Box 274, Redmond, Wash.—Resident Manager, Gerald C. Emerson and Associates

KILBOURN, Max W., 323 Reid Ave., Port St. Joe, Fla.—Land Surveyor

KINNEAR, Arthur G., 5113 Wissioming Rd., Washington 16, D. C.—Geodesist, Army Map Service

KNODERER, Elmer C., 3rd, 2918 1st Road, North, Arlington 1, Va. — Engineering Aid, Alfred Copeland

KNOLES, Claude H., 132 N. Chelsea St., Kansas City, Mo.—Photogrammetric Aid, Army Map Service

KRAVITZ, James, 6885 Palomar Way, Riverside, Calif.—Civil Engineer, Riverside County Road Dept.

KUENN, Walter N., 3401½ W. 82nd St., Inglewood 4, Calif.—Surveyor, Pafford & Associates

KULP, Elmer F., Jr., 630 Federal Bldg., Detroit 26, Mich.—Surveyor, U. S. Lake Survey

KUROWSKI, Edward J., Jr., 7059 Larchmont Drive, North Highlands, Calif.—Land Surveyor, State of California

KUWAMURA, Frank K., Jr., P. O. Box 715, Curundu, Canal Zone — Instructor, Inter American Geodetic Service Cartographic School

LADY, Dale E., 5652 Field St., Arvada, Colo.—Cartographic Aid, U. S. Forest Service

LAIRD, David J., 613 West 2nd St., Erie, Pa.—Surveyor

LARKIN, Madison F., P. O. Box 21, Rock Tavern, N. Y.—Chief of Survey, Geotechnics & Resources, Inc.

LARSON, Richard H., 7869 W. 46th Ave., Wheat Ridge, Colo.—Cartographer, U. S. G. S.

LAWRENCE, Wilford H., 2301 Market St., Philadelphia 3, Pa. — Drafting Squad Chief, Philadelphia Electric Co.

LEWIS, Boyce C., 1601 Irene Ave., Modesto, Calif.—Party Chief, H. W. Jorgensen & Associates

LEWIS, Robert S., 3415 Pestdozzi St., St. Louis 18, Mo.—Cartographer, A. C. I. C.

LIEBETREU, Ernest A., 19340 Beech Rd., Detroit 40, Mich.—Surveyor, U. S. Army Corps of Engineers

LINDSAY, Maurice E., 4313 N. Carlisle St., Philadelphia 40, Pa.—Draftsman, Aero Service Corp.

LOELKES, George L., Jr., 13 Birch Drive, Nanuet, N. Y.—Engineer, Autometric Corp.

LOVE, Billy J., Midwest Trailer Court, 35 Grove St., Independence, Mo.—Compiler, Army Map Serivce

LOWELL, Gene H., R. F. D. 1, Rock Tavern, N. Y.—Assistant Chief of Surveys, Geotechnics & Resources, Inc.

LUM, Hing, 2208-B Liliha St., Honolulu 17, Hawaii—Surveyor, State Survey Division

LUSHENE, Ensign Robert E., U. S. Coast & Geodetic Survey, Department of Commerce, Washington 25, D. C.

MANN, Philip, P. O. Box 1216, Morenci, Ariz.—Student

MARCH, Chester A., 1222 15th Ave., Greeley, Colo.—Draftsman, Miner and Miner

MASONIER, Henry E., 1946 S. Acoma St., Denver 23, Colo.—Cartographic Aid, U. S. Forest Service

MAYFIELD, Thomas G., 305 N. 3rd St., Clinton, Mo.—Student

McCORMICK, Charles T., 3743 Hines Ave., Jackson 4, Miss. — Engineer, Mississippi State Highway Dept.

McCREA, James, 1416 W. Main St., Norristown, Pa.—Vernon Graphics of Pennsylvania, Inc.

McCURRY, L. H., 900 Polk St., Room 808, Amarillo, Tex.—Engineer, A. T. & S. F. Railway Co.

McDONALD, Thomas M., 1025 Sherman St., Denver, Colo.—Cartographer

McGEORGE, W. L., 15601 S. E. Meadow Lark Lane, Portland 22, Oreg.—Land Surveyor

McGRAIL, Francis Edward, 931 University Ave., Honolulu, Hawaii—Field Engineer

MEACHUM, V. H., California State Polytechnic College, San Luis Obispo, Calif.—Instructor

MEIER, Bruce W., 232 S. Ammons St., Denver 26, Colo.—Photogrammetrist, U. S. G. S.

METZGER, Joe H., 5640 Minnesota Drive, Denver 22, Colo.—Cartographer, U. S. G. S.

MEYER, Fred, Jr., 900 N. William St., Baldwin, N. Y.—Civil Engineer

MILLARD, Roy D., 64 Eastwood Drive, West Seneca 24, N. Y.—Land Surveyor

MILLER, Sandy J., 4858 San Francisco St., St. Louis 15, Mo.—Cartographer, A. C. I. C.

MILLS, Robert W., 1861 Deerfield Rd., Milford, Ohio—Surveyor

MITCHELL, Newell D., Stelling, Lord-Wood and Van Suetendael, 26 E. 36th St., New York 16, N. Y.

MORGAN, Calvin L., 3501 Fair Ave., St. Louis 15, Mo.—Cartographer, A. C. I. C.

MORRILL, Harold P., P. O. Box 310, Farmingdale, L. I., N. Y.—Civil Engineer and Land Surveyor, H. G. Holzmacher and Associates

MOSHER, L. W., 14050 W. McNichols Rd., Detroit 35, Mich.—Owner, Mosher Associates, Consulting Engineers

MOTE, Robert G., 3024 Davidson Ave., San Bernardino, Calif.—Assistant City Engineer

MUDGETT, Ralph D., 1405 Broad St., Altavista, Va.—Construction Engineer, American Electric Power Company Service Corp.

MUEGGE, Arthur E., Jr., 7908 Gateway Blvd., Washington 28, D. C.—Cartographer, U. S. Navy Hydrographic Office

MYERS, H. J., P. O. Box 1345, OCS, Lafayette, La.

NEAL, Russell E., Route 1, Lehighton, Pa.—Civil Engineer

NELMS, Harvey J., R. F. D. 2, Adena, Ohio—Surveying, Mapping, Mining Reports

NEWHOUSE, Howard, S. O. Newhouse Surveying & Engineering Co., Wedderburn, Oreg.

NEWTON, William J., 1929 Davis Rd., West Falls, N. Y.—Land Surveyor

NICHOLAS, Mrs. Lilla D., 619 F. Jackson Rd., Webster Groves 19, Mo.—Cartographer, A. C. I. C.

NOLDE, Edwin W., 11824 Lillian St., Des Peres 31, Mo.

NORRIS, Miss Winifred J. E., 3835 Main St., Kansas City, Mo. — Cartographic Compilation Aid, Army Map Service

NORWOOD, Ralph R., 1148 W. Fillmore St., Phoenix 7, Ariz.—Transitman, Arizona Surveying Service

OAKES, Richard L., Bureau of Land Management, Building 50, Denver Federal Center, Denver 25, Colo.—Supervisory Cadastral Surveyor

OLDS, W. Warren, 3929 Regan Drive, San Mateo, Calif.—Surveyor, Wilsey, Ham & Blair

OLESIEWICZ, Stanley T., 890 W. 45th Place, Hialeah, Fla.—Land Surveyor

OLSEN, Lawrence O., c/o Hamilton & Olsen, Ltd., 9675 102A Ave., Edmonton, Alberta, Canada — Land Surveyor and Civil Engineer

OLSON, William L., 1126 Sea St., Quincy, Mass.—Civil Engineer

PALMER, Donald J., 122 W. 97th Terrace, Kansas City 14, Mo.—Cartographic Technician, Army Map Service

PALMER, Rufus D., 304 Stephenson St., Shreveport, La.—Draftsman, Caddo Parish Tax Assessor

PAZ Y MINO, Lt. Col. Nelson G., Leon 423, Quito, Ecuador—Instituto Geografico Militar

PENNEL, John W., 202 E. 4th St., Panama City, Fla. —Land Surveyor

PEREJDA, Dr. Andrew D., 265 Champion St., Battle Creek, Mich.—Geographical Analyst

PETERSON, Charles E., 1022 Oak Ave., Panama City, Fla.—Land Surveyor

PETERSON, Robert E., 24 Mellen St., Bristol, Conn. —Surveyor, City of Bristol

PETRIDES, Thracy, 250 Park Ave., New York 17, N. Y.— Director, Government Programs Department, U. S. Industries, Inc.

PLASKET, Jack R., 401 University Blvd., Glassboro, N. J.—President, Engineering Surveys, Inc.

POKORNY, Frederick R., 210 Old Country Rd., Mineola, N. Y.—Civil Engineer

POTTER, Anson B., 6320 W. Coulter Ave., Glendale, Ariz.—Field Supervisor, Maddock & Associates

POYER, Frank J., 130 N. Ellicott Creek Rd., Tonawanda, N. Y.—Surveyor

PRATT, James K., Star Route, Box 92, Morrison, Colo.—Cartographer, U. S. G. S.

PRINGLE, J. E., 1216 Wrightwood St., Houston 9, Tex.

PULSE, Richard R., 2530 Upham St., Denver 15, Colo.—Civil Engineer, U. S. Forest Service

PURSER, Claire F., P. O. Box 462, Twentynine Palms, Calif.—Richard G. Davis

RALE, David H., 825 N. 5th Ave., Tucson, Ariz.— Chainman-Rodman-Draftsman, Marum & Marum Engineering Co.

RACHAL, James C., 1202 Emory Drive, Panama City, Fla.—Land Surveyor

REED, Lloyd W., 745 Northampton Drive, Silver Spring, Md.—Cartographic Aid, U. S. G. S.

REFOY, David H., 20 Ochterloney St., Dartmouth, Nova Scotia, Canada — Secretary-Treasurer, Atlantic Air Survey Co., Ltd.

REFSIN, Marvin M., 1516 S. 58th St., Philadelphia 43, Pa. — Design Engineer, Pennsylvania Department of Highways

ROBILLARD, W. G., 1320 Fenway Circle, Decatur, Ga.—Cartographer, U. S. Forest Service

ROBINSON, William S., c/o R. M. Towill, Inc., 612 Howard St., San Francisco 5, Calif.—Civil Engineer

ROCKWELL, Lewis W., 917 E. Union Ave., Fullerton, Calif.—Instructor, Fullerton Junior College

ROGERS, Allan B., Jr., 2330 Glenwood Drive, Boulder, Colo.—Project Engineer, Bureau of Public Roads

ROSEN, Sherman, 355 Richmond Rd., Cleveland 24, Ohio—Photogrammetrist

ROSSITTER, Bob R., 803 Sklar Bldg., Shreveport, La.—Party Chief, Paul Barber

ROUSE, Robert M., 11 Ross Place, Auburn, N. Y.

RUBASH, James J., 6610 Flamingo St., Houston 17, Tex.—Civil Engineer, Atlantic Refining Co.

RUIZ, Francisco Moncayo, Mollendo 1039, Col. Lindavista, Mexico, D. F.—Auxiliar Tecnico, Comision Forest. Del Edo. De Mich.

RUSSELL, Paul B., P. O. Box 397, San Andreas, Calif.—County Surveyor, Calaveras County

SAMPSON, Jack W., 1318 Woodruff St., St. Louis 33, Mo.—Cartographer, A. C. I. C.

SANDERSON, Donald E., 209 Rogers Drive, Falls Church, Va.—Surveyor

SARGENT, Connie E., 6166 W. 8th Ave., Lakewood 15, Colo.—Draftswoman, Continental Engineering

SARGENT, Don C., 6166 W. 8th Ave., Lakewood 15, Colo.—Consulting Geologist

SCHEEL, Eugene M., National Geographic Society, 16th and M Sts., N.W., Washington 6, D. C.—Cartographer

SCHILLING, Frank R, Jr., 624½ Cove Blvd., Panama City, Fla.—Land Surveyor

SCHLEPPENBACH, Frank X., 835 Main St., Longmont, Colo.—Partner, Whitney & Schleppenbach

SCHREIBER, Harold E., 625 Hardesty St., Kansas City, Mo.—Cartographer, Army Map Service

SCHUMACHER, Donald, 8220 Finley Ave., La Mesa, Calif.—Civil Engineer, City of La Mesa

SCHWARM, Joe A., 501 N. Birch St., Coquille, Oreg. —Assistant to City Engineer

SCRANTON, Jack C., 511 Pinhook Rd., Lafayette, La. —Party Chief, John E. Chance & Associates, Inc.

SELBY, Edwin J., 2301 Market St., Philadelphia 3, Pa. — Drafting Squad Chief, Philadelphia Electric Co.

SELF, Charles, 749 St. Nicholas St., East St. Louis, Ill.—Cartographer, A. C. I. C.

SERVANT, Walter E., 21 George Dauphinee Ave., Halifax, Nova Scotia, Canada—Land Surveyor

SESSINGER, Harry G., 2301 Market St., Philadelphia 3, Pa.—Supervisor, Maps and Records, Philadelphia Electric Co.

SHAW, R. P., 162 Hotel De Ville, Hull, Quebec, Canada — President, Shaw Photogrammetric Services, Ltd.

SHIOTA, Norman I., 1617-B Fern St., Apt. 3, Honolulu, Hawaii — Surveyor, L. Frederick Pack & Associates

SHOCKCOR, James C., 1477 Selkirk Rd., Columbus 13, Ohio—Surveyor

SHORAK, Frederick, 3019 Kramer St., Silver Spring, Md.—Cartographic Compiler, U. S. G. S.

SHREFLER, Donald G., 75 Zephyr St., Lakewood, Colo.—Civil Engineer, U. S. G. S.

SHUTE, Kenneth W., 612 S. Flower St., Los Angeles 17, Calif.—Draftsman, Humble Oil & Refining Co.

SIEGEL, Joseph P., 1625 Muhlenberg Drive, Norristown, Pa.—Salesman, Philadelphia Blue Print Co.

SIEVER, Glenn E., 7232 W. 67th Place, Arvada, Colo. —Chief, Jefferson Co.

SIMON, Fredericka A., 9100 W. 32nd Ave., Wheat Ridge, Colo. — Cartographic-Photogrammetric Aid, U. S. G. S.

SMITH, Eugene Eberhart, 1019 Findley Drive, West, Pittsburgh 21, Pa. — Field Engineer, Berndtson Northwest, Inc.

SMITH, W. T., 1425 N. 1st St., Phoenix, Ariz.—President, Engineering Supply & Reproduction

SNELL, Robert, 4 Crescent Bluff Ave., Branford, Conn.—Party Chief, Chas. A. Cahn Co.

SNIPES, SSgt. Bobby R., 2nd Topographic Co., FMFLant, Camp Jejeune, N. C.—Topographic Surveyor, U. S. Marine Corps

SNYDER, Robert F., Route 2, Box 123-H, Vienna, Va. Ch. Geo Sciences Sup. Branch Det 1, A. C. I. C.

SPERANDEO, Edward, 6006 23rd Place, S.E. Washington 21, D. C.—Cartographer, U. S. Navy Hydrographic Office

SPINA, Roy D., Jr., 2995 Peralta Way, Fresno 3, Calif.—Student, Fresno State College

STAMPER, H. N., P. O. Box 2180, Houston, Tex.

STARK, John X., 518 3rd St., S.W., Crosby, Minn.— Land Surveyor

STEENSLAND, Maurice J., 407 Englewood Drive, Dothan, Ala.—Land Surveyor

STEINGARD, Nelson, 1027 Ruatan St., Silver Spring, Md.—Cartographer, U. S. Navy Hydrographic Office

STEINMAN, Arthur W., 2003 Barksdale Drive, Orlando, Fla.—Land Surveyor

STEPHENSON, George N., 219 Main St., Apt. 1, Follansbee, W. Va. — Surveyor-Photographer, Thomas Engineering & Surveying Co.

STRALEY, Roy J., 308 Brisbane Bldg., Main and Clinton Sts., Buffalo, N. Y.—Land Surveyor

STRICKLAND, Mrs. Dolores B., 1818 Rittenhouse Square, Philadelphia, Pa.—Draftsman, Redevelopment Authority

SUBBHASIDDHI, Khamnuong, 161 Wat Pra Ya Kri, Yannawa, Bangkok, Thailand—Instructor, Bangkok Technical Institute

SUTTON, Jerry M., 1621 Ralston St., Independence, Mo.—Instrumentman, Oliver Surveying

SUTTON, Ted L., 5823 W. MacKenzie St., Phoenix 31, Ariz.—Draftsman, Maddock & Associates

SWACKENBERG, Walter, 6015 Everett St., Arvada, Colo.—Land Surveyor

SWAIN, Henry A., 7004 Waldran Ave., S.E., Washington 22, D. C.—Cartographer, U. S. Navy Hydrographic Office

SWAIN, Julian, 223 Maederis Drive, Decatur, Ga.—Engineer, Dekalb County Sewer Dept.

SWARTZ, Richard F., 211 W. Union St., Newark, N. Y.—Partner, Harnish & Lookup

SWIFT, John D., 201 Chambers Bldg., Olympia, Wash. — Engineer-Surveyor, John D. Swift & Associates

TANGO, Richard, 1416 W. Main St., Norristown, Pa. —Vernon Graphics of Pennsylvania, Inc.

TERRYBERRY, John, 824 Queen Ridge Drive, Independence, Mo.—Cartographic Aid, Army Map Service

THOMAS, Glenn E., P. O. Box 6662, Orlando, Fla.—Land Surveyor

THOMPSON, John M., Sr., 3987 Northern Pike, Monroeville, Pa.—Land Surveyor

TINDALL, Robert F., Room 606, State Office Bldg., 100 N. Senate Ave., Indianapolis 4, Ind. — Chief, Survey and Mapping Section, Indiana Flood Control and Water Resources Commission

TOAL, Richard J., 19130 W. Outer Drive, Dearborn, Mich.—Civil Engineer, Salle Engineering Co.

TOLPEN, David S., 507 Impala Lane, Hazelwood, Mo.—Cartographer, A. C. I. C.

TOMSHECK, William H., 2203 Vimont Ave., Salt Lake City 9, Utah — Chief, Western Laboratory, CSS, U. S. D. A.

TORIGOE, Robert S., 34 S. Beretania St., Honolulu, Hawaii—Land Surveyor, Park Engineering, Inc.

TRIPP, O. W., 413 S. 12th St., Salina, Kans.—Land Surveyor

TUTTLE, Wallace, S., 4105 Woodhaven St., Houston, Tex.

URAINE, William A., 6420 Crossway Drive, Pico Rivera, Calif.—Party Chief, Los Angeles County Road Dept.

VACHE, Steven J., 1527 E. 51st Terrace, N., Kansas City 18, Mo.—Photogrammetrist, Army Map Service

VANCE, John David, Gaston Technical Institute, 1025 W. Franklin Ave., Gastonia, N. C. — Head, Civil Technology Dept.

VAN NESS, Keith D., 10512 Tenbrook Drive, Silver Spring, Md. — Cartographer, U. S. Navy Hydrographic Office

VICK, James W., 364 Glenwood St., Daly City, Calif. —Salesman, A. Lietz Co.

VOISIN, Russell, P. O. Box 7600, Chicago 80, Ill.—General Manager, Cartographic Dept., Rand McNally & Co.

WAGNER, David E., P. O. Box 116, Denver 11, Colo. —Engineering Aid

WALKER, George A., Jr., 9413 Jackson Ave., Washington 22, D. C.—Civil Engineer, U. S. Navy Hydrographic Office

WALLACE, William G., P. O. Box 1985, West Palm Beach, Fla.—Land Surveyor

WARD, Russell S., 1705 Tyndall Drive, Panama City, Fla.—Land Surveyor

WATSON, James J., 2895 S. Williams St., Denver 10, Colo.—Civil Engineer, Watson Engineering

WATTLES, Bennett R., P. O. Box 766, Lake City, Fla.—Land Surveyor

WEAVER, John F., P. O. Box 2819, Dallas 1, Tex.—Photogeologist, Atlantic Refining Co.

WEBB, Florentin P., 3524 W. 78th St., Inglewood 4, Calif.—Chief Surveyor, Shell Oil Co.

WEBBER, Charles D., 1759 Akron St., Aurora 8, Colo.—Party Chief, Meurer-Serafini-Meurer

WEIR, Miss Virginia A. L., 2022-A 37th St., S.E., Washington 20, D. C.—Cartographer, U. S. Navy Hydrographic Office

WEISS, Ronald, Philadelphia City Planning Commission, Penn Square Bldg., Juniper and Filbert Sts., Philadelphia, Pa.—Draftsman

WHITLER, Eugene W., 221 S. 7th St., Vandalia, Ill. —Land Surveyor

WHITNEY, Robert T., 835 Main St., Longmont, Colo. —Partner, Whitney & Schleppenbach

WHYMAN, Marvin H., 7562 Melrose Ave., University City 30, Mo.—Cartographer, A. C. I. C.

WIGGERT, Dohren W., 2240 S. Peninsula Drive, Daytona Beach, Fla. — Civil Engineer, Reynolds, Smith and Hills

WILDER, John Joseph, 1857 S. Locust St., Denver 22, Colo. — Project Administrator, Denver Urban Renewal Authority

WILKINS, Charles J., 306 Decatur St., N.W., Apt. 3, Washington 11, D. C.—Mathematician, Army Map Service

WILKINS, R. A., Bookers Sugar Estates, Ltd., 22 Church St., Georgetown, British Guiana, S. A. — Director, Bookers Sugar Estates, Ltd.

WILKINSON, Roger C., 800 Sklar Bldg., Shreveport, La.—Office Manager, McLemore & Atchley

WILLIAMS, Walter T., Jr., P. O. Box 1967, Houston, Tex.—Civil Engineer, Phillips Petroleum Co.

WILLIS, Laurence H., 251 Shun Pike Rd., South Burlington, Vt.—Engineer and Contractor

WILSON, George E., P. O. Box 771, Madras, Oreg.— Street Superintendent

WINNE, Bert C., Jr., Mt. Tremper, N. Y.—Land Surveyor-Forest Surveyor, State of New York Conservation Dept.

WOOD, Leonard B., 316 E. El Camino Drive, Phoenix 18, Ariz.—Party Chief, Maddock & Associates

WOODBURY, W. Jack, 79 Chestnut St., Fredonia, N. Y.—Civil Engineer and Land Surveyor

WOOLERY, William S., P. O. Box 4577, Jacksonville 1, Fla.—Land Surveyor

WORTH, Geary H., 2191 E. 15th Ave., Eugene, Oreg. —Locating Engineer, Oregon State Highway Dept.

XARAS, Andrew T., 346 Kirks Lane, Drexel Hill, Pa. —Drafting Squad Leader, Philadelphia Electric Co.

YATES, Franklin, 33 Peony Rd., Levittown, Pa.—Draftsman, Aero Service Corp.

YORITOMO, Leonard Y., 206 S. Alcott St., Denver, Colo.—Cartographer, U. S. G. S.

GEOGRAPHICAL DISTRIBUTION OF NEW MEMBERS LISTED ABOVE

Alabama	2	Indiana	2	Nevada	—	Tennessee	1
Alaska	—	Iowa	—	New Hampshire	—	Texas	14
Arizona	13	Kansas	3	New Jersey	4	Utah	1
Arkansas	—	Kentucky	1	New Mexico	1	Vermont	2
California	31	Louisiana	8	New York	25	Virginia	9
Colorado	45	Maine	1	North Carolina	5	Washington	2
Connecticut	4	Maryland	9	North Dakota	—	West Virginia	1
Delaware	—	Massachusetts	4	Ohio	8	Wisconsin	—
District of Columbia	12	Michigan	7	Oklahoma	—	Wyoming	1
Florida	17	Minnesota	1	Oregon	11		
Georgia	2	Mississippi	1	Pennsylvania	27	Total	316
Hawaii	4	Missouri	29	Rhode Island	—		
Idaho	—	Montana	—	South Carolina	2	Possessions	1
Illinois	4	Nebraska	1	South Dakota	1	Foreign	12
						Total	329

CONGRESS DIRECTORY

EXECUTIVE OFFICERS

PRESIDENT: Brother B. Austin Barry, Civil Engineering Department, Manhattan College, New York 71, N. Y.

VICE PRESIDENT: Walter S. Dix, 435 Woodward Building, c/o TVA, Washington 5, D. C.

EXECUTIVE SECRETARY: Walter S. Dix, 435 Woodward Bldg., c/o TVA, Washington 5, D. C.

TREASURER: Capt. H. W. Hemple, c/o American Congress on Surveying and Mapping, Room 430 Woodward Bldg., 733 15th St., N.W., Washington 5, D. C.

EDITOR: Howard S. Rappleye, 6712 Fourth St., N.W., Washington 12, D. C.

STANDING COMMITTEE CHAIRMEN

BUDGET: John M. Amstadt, 5350 2nd St. North, Arlington, Va.

CONSTITUTION: Walter S. Dix (Acting), 435 Woodward Bldg., c/o TVA, Washington 5, D. C.

MEMBERSHIP: Capt. Frank S. Borden, Room 430 Woodward Bldg., 733 15th St., N.W., Washington 5, D. C.

PROFESSIONAL STATUS: Lester C. Higbee, W. & L. E. Gurley, Troy, N. Y.

PUBLIC RELATIONS: Helmuth Bay, 1104 National Press Bldg., Washington 4, D. C.

PUBLICATIONS: A. J. Wraight, Coast and Geodetic Survey, Washington 25, D. C.

22ND ANNUAL MEETING: Joseph P. Dunich, 2914 Burton Hill Dr., Kensington Heights, Md.

DIVISION CHAIRMEN

CARTOGRAPHY: Robert J. Beaton, U. S. Navy Hydrographic Office, Suitland, Md.

CONTROL SURVEYS: Julius L. Speert, U. S. Geological Survey, Washington 25, D. C.

EDUCATION: Prof. John O. Eichler, Georgia Institute of Technology, Atlanta, Ga.

INSTRUMENTS: Clifford A. Thorpe, Jr., P. O. Box 278, Falls Church, Va.

PROPERTY SURVEYS: W. J. Reese, Box 819, Rock Island, Ill.

TOPOGRAPHY: David Landen, Room 5253, Interior Building, Washington 25, D. C.

LOCAL SECTION OFFICERS

ARIZONA: Robert Frazer, *Chairman*, 211 W. Pennington St., Tucson, Ariz.

James O. Reed, *Secretary*, 2303 Cameron Vista, Tucson, Ariz.

COLORADO: Louis S. Soreide, *Chairman*, 618 Perry St., Denver, Colo.

Waldo G. Smith, *Secretary-Treasurer*, 3821 W. 25th Ave., Denver 11, Colo.

DELAWARE VALLEY: Thomas Hasett, *Chairman*, 9815 Redd Rambler Drive, Philadelphia 15, Pa.

Raymond B. Walsh, *Secretary-Treasurer*, 201 East Park Avenue, Apartment "C," Ambler, Pa.

GREAT LAKES: Prof. Kenneth L. Curtis, *Chairman*, Civil Engineering Dept., Purdue University, Lafayette, Ind.

Dr. George E. Ekblaw, *Secretary*, 216 Natural Resources Bldg., Urbana, Ill.

HAWAII: Henslee Towill, *Chairman*, 233 Merchant St., Honolulu 13, Hawaii

James Chrystal, Jr., *Secretary-Treasurer*, 106 Wyllie St., Honolulu 17, Hawaii

KANSAS CITY: Dushan Sumonia, *Chairman*, c/o Army Map Service, 625 Hardesty, Kansas City 24, Mo.

Mrs. Nancy Erlich, *Secretary*, c/o Army Map Service, 625 Hardesty, Kansas City 24, Mo.

LOUISIANA: Guy F. Radley, *Chairman* c/o Humble Oil Co. P. O. Box 626, New Orleans, La.

R. S. Burnside, Jr., *Secretary*, 513 N. Bengal Road, Metairie, La.

NEW MEXICO: Robert B. Stephenson, *Chairman*, 9116 Candeleria Road, NE, Albuquerque, N. Mex.

Everett Ross, *Secretary*, Box 418, Albuqurque, N. Mex.

NORTH CAROLINA: Benjamin L. Smith, Jr., *Chairman*, 1414 Westover Terrace, Greensboro, N. C.

Dale J. Mills, *Secretary-Editor*, P. O. Box 178, Gastonia, N. C.

NORTHERN CALIFORNIA: James Brennan, *Chairman*, Jack Tar Hotel, San Francisco, Calif.

Harl V. Pugh, *Secretary-Treasurer*, c/o Towill Aero Co., 612 Howard St., San Francisco, Calif.

OREGON: H. Bruce Schminky, *Chairman*, 407 City Hall, Portland 4, Oreg.

Francis E. Waggoner, *Secretary-Treasurer*, Lane County Courthouse, Eugene, Oreg.

SOUTHERN CALIFORNIA: Section address—P. O. Box 631, Main Office, Los Angeles 53, Calif.

James W. Robinson, *Chairman,* 433 S. Spring St., Los Angeles 13, Calif.

George L. Matthieson, *Secretary,* 4417 N. Carvol Ave., Covina, Calif.

ST. LOUIS: Charles H. Frey, *Chairman,* 125 Peeke Ave., Kirkwood 22, Mo.

Robert H. Kingsley, *Vice Chairman,* 830 Warwick Lane, Glendale, Mo.

TEXAS: Section address—P. O. Box 691, Houston 1, Texas

Virgil A. Walston, *Chairman,* Humble Oil & Refining Co., P. O. Box 2180, Houston 1, Texas

Paul W. Wiseman, *Secretary,* Atlantic Refining Co., P. O. Box 2412, Houston 1, Texas

Treasurer—James W. Harding

UTAH: Prof. Clifford G. Bryner, *Chairman,* Annex 242, University of Utah, Salt Lake City 12, Utah

Capt. I. E. Rittenberg, *Secretary-Treasurer,* 110 East 5600 South, Murray, Utah

SUSTAINING MEMBERS

ABRAMS INDUSTRIES, (Abrams Aerial Survey Corp., Abrams Instrument Co.), Lansing, Mich.

AGA CORPORATION OF AMERICA, 2013 Park Ave., South Plainfield, N. J.

AERO SERVICE CORP., 236 East Courtland St., Philadelphia, Pa.

C. L. BERGER & SONS, INC., 37 Williams St., Boston, Mass.

BUFF & BUFF MANUFACTURING COMPANY, 329 Lamartine St., Jamaica Plain 30, Mass.

COOKE, TROUGHTON & SIMMS, INC., 91 Waite Street, Malden 48, Mass.

CUBIC CORPORATION, 5575 Kearny Villa Road, San Diego 11, Calif.

CUBIC EUROPA, SpA, Via Archimede 185, Roma, Italia

EUGENE DIETZGEN CO., Chicago—New York—San Francisco—New Orleans

W. & L. E. GURLEY (4 Memberships), Troy, N. Y.

HILGER & WATTS, LTD., London, England; represented by Eugene Dietzgen Co., and Engis Equipment Co., Chicago, Ill.

INTERNATIONAL AERIAL MAPPING CO., 127 Air-Port Blvd., San Antonio 12, Tex.

KERN & CO., LTD., Aarau, Switzerland; represented by Kern Instruments Inc., 120 Grand St., White Plains, N. Y.

KEUFFEL & ESSER CO., Adams & Third Sts., Hoboken, N. J.

GEO. F. MUTH CO., INC., 1332 New York Avenue, N.W., Washington 5, D. C.

RAND McNALLY & CO., (2 Memberships), Chicago, Ill.

VICTOR O. SCHINNERER & COMPANY, INC., Investment Building, 1511 K Street, N.W., Washington 5, D. C.

R. M. TOWILL CORP., 233 Merchant St., Honolulu, Hawaii

UNITECH CORPORATION, 50 Colfax Ave., Clifton, N. J.

WILD HEERBRUGG INSTRUMENTS, INC., Main and Covert Sts., Port Washington, N. Y.

ZEISS-AEROTOPOGRAPH, Munich, Germany; represented by Transmares Corporation, 15 William St., New York 5, N. Y., and 929 Highgate Road, Alexandria, Va.

SURVEY CALCULATIONS & ADJUSTMENTS
TRIANGULATION — TRAVERSE — LEVEL NETS
LEAST SQUARES ADJUSTMENTS
EARTHWORK — CROSS SECTIONS
SUBDIVISION COMPUTATIONS
TELLUROMETER & GEODIMETER REDUCTIONS
ELECTRONIC COMPUTING

ENGINEERS SURVEYING & CALCULATING SERVICE
5526 N. SAYRE AVE.
CHICAGO 31, ILLINOIS
NEwcastle 1-5595

AMERICAN AIR SURVEYS, INC.

Aerial Topo Maps
Aerial Photos & Mosaics
Plan & Profile
Tax Maps

907 PENN AVE., PITTSBURGH 22, PENNA.
BRANCHES: MANHASSET, N. Y. • ATLANTA, GA.
Cooperation With Local Surveyors
A Nationwide Service

"Geodesy and Cartography"

The Russian publication *Geodesy and Cartography* is published monthly under the auspices of the Main Administration of Geodesy and Cartography of the USSR Ministry of Internal Affairs.

The English edition contains two issues each of the Russian edition. It has a page size of 8½ × 11 inches, approximately 100 pages per issue, and is printed by photolithography from excellently prepared typewritten copy in modern "executive" face.

All subjects of the broad scope of surveying and mapping are covered, including geodesy, topography, photogrammetry, cartographic production and reproduction, computing, etc.

Announcement

The English edition of the Russian publication *Geodesy and Cartography* is available at discount to ACSM members.

ACSM members will be granted a 20% discount from the list subscription price of $20.00 per volume, or a similar discount from the $7.50 price per copy, under an arrangement of cosponsorship with the American Geophysical Union, which is responsible for the edition under a grant from the National Science Foundation. Each issue in the English edition contains two numbers of the Russian edition. 1960 numbers are in the translation and printing stages, with about half of the numbers for the year already published. The 1959 volume is fully published and is available at the same discount to ACSM members. Send your order with check or money order to the Treasurer, American Congress on Surveying and Mapping, 430 Woodward Building, 733 15th St., N.W., Washington 5, D. C.

Colonel F. O. Diercks, Commanding Officer, Army Map Service, applies mortar to the cornerstone of Abert Hall, the new Cartographic Engineering Building, at the Engineer Day-Cornerstone Ceremonies held June 16, 1961, at the Army Map Service, Brookmont, Maryland. Looking on at the right is Major General S. R. Hanmer, Deputy Chief of Engineers for Military Operations, who delivered the principal address and took the leading role in the laying of the cornerstone. The new Cartographic Engineering Building is called Abert Hall after Colonel John James Abert (1788–1863) who was for 23 years Chief of the Corps of Topographical Engineers.

Changes at the Army Map Service

The summer of 1961 has been unusually significant for the Army Map Service. It marked the cornerstone laying of a new multimillion-dollar Cartographic Engineering Building, Abert Hall, and the loss of its Commanding Officer, Colonel F. O. Diercks, CE, who has completed four eventful years as the installation's chief mapper. In August, Colonel Diercks moved to duties in the Office of the Assistant Chief of Staff, Intelligence, Department of the Army.

The cornerstone of Abert Hall was laid on June 16, 1961, Engineer Day. The new five-story building, with penthouse, will be the companion of Erskine Hall, which has been the main cartographic structure and headquarters of the Army Map Service since 1945. Joined to Erskine Hall by connecting corridors on the first three floors, the new building will provide additional space for the thousands of employees and multitudes of cartographic and intelligence projects that now tax the not inconsiderable resources of Erskine Hall. Slated for completion in December 1961, the building was a major undertaking during the administration of Colonel Diercks.

In the four years that Colonel Diercks has directed the destiny of the Army Map Service, a great number of important advances have been made in every phase of the mapping process. Methods have been invented or improved, striking equipment has been developed, and imaginative projects initiated which command the respect and admiration of all who learn about them. Many of these advances have been described in the pages of SURVEYING AND MAPPING. Colonel Diercks has carried forward a mapping program of international scope that includes the cooperation and goodwill of some 57 foreign nations. In addition to mapping the earth, the Army Map Service has turned to the heavens and essayed to produce what is believed to be the first topographic map of the moon compiled by stereophotogrammetric methods. The preliminary sheets of this project are a fitting capstone for Colonel Diercks' total contribution to the progress of military mapping.

Colonel Diercks has been succeeded at the Army Map Service by Colonel Robert C. Miller, formerly Chief, Mapping and Geodesy Division, Engineer Office, USARPAC.

COLONEL F. O. DIERCKS

Tenth Pacific Science Congress

A world-famed international gathering of scientists returned this summer to its birthplace in Hawaii for the first time in forty years. More than 1,200 men of sciences from 40 countries attended the Tenth Pacific Science Congress from August 21 to September 6, 1961, at the University of Hawaii.

The scope of investigation of the Pacific Science Congresses has broadened enormously since the first gathering of 103 scientists in the throne room of Iolani Palace in Honolulu in 1920. There, under the leadership of the late Herbert E. Gregory, director of the Bishop Museum, the Congress was founded, and it has met since then at intervals of approximately four years. Meetings intervening between 1920 and 1961 were held in Australia, Japan, Canada, Netherlands East Indies, California, New Zealand, the Philippines, and Thailand.

ASP Semiannual Convention

The North Atlantic Region of the American Society of Photogrammetry will sponsor the society's Semiannual Convention and Technical Exhibit at the Biltmore Hotel in New York City, October 4–6, 1961.

The emphasis of this meeting will be directed toward the more exotic aspects of photogrammetry and will also include the latest advancements in the basic engineering applications of photogrammetric principles. The dissemination and exchange of information will be accomplished by the presentation of technical papers and the demonstrations at the various equipment exhibits.

KEYNOTE SPEAKER

Sherman M. Fairchild, noted for his many pioneering successes in the field of photogrammetry, will be the keynote speaker at this fall convention.

Mr. Fairchild, founder of the Fairchild Camera and Instrument Corporation and several other firms bearing his name, has been credited with many of the photogrammetric "firsts" in aerial reconnaissance and mapping. His many achievements include the development of the between-the-lens shutter for aerial cameras, the design and fabrication of the first practical cabin aircraft for high altitude mapping, and the establishment of an aerial surveying company which mapped New York City in 1922.

His support of and sustained interest in photogrammetry is evidenced by the establishment of the annual Sherman M. Fairchild Award in the early years of the society. To this day, he has maintained this interest by his emphasis of research and development in the various Fairchild organizations. These activities currently include work on new photogrammetric techniques and instruments as well as new aircraft.

Western Regional Conference—1961

The Western Regional Conference, sponsored by the Arizona Section, ACSM, is scheduled for October 18–21, 1961, at the Westward Ho Hotel in Phoenix, Arizona.

Registration will begin at 9:00 a.m., Wednesday, October 18th., and in the afternoon there will be an opening session with the addresses welcoming the registrants to Arizona. During the afternoon the exhibits will be opened. Instrument manufacturers, suppliers, and technical service organizations will have displays. Exhibitors include Surveyors Service Company, Keuffel & Esser Company, Eugene Dietzgen Company, Scott Technical Instrument Company, Technical Advisors, Inc., International Aerial Survey Company, Map-o-Graph, Cubic Corporation, E. I. du Pont de Nemours & Co., and many others. Wednesday evening will be devoted to the Exhibitors Cocktail Hour and Hospitality Night.

The sessions for presentation of technical papers will be held during the days of October 19th and 20th, and the evening of the 19th will be given over to a Western barbecue and entertainment on the dessert. Friday evening will feature a semiformal dinner dance. Sight-seeing and educational tours are planned for Saturday, the 21st., and the exhibits will close at 1:00 p.m., on that day.

A complete program for the ladies is planned and will include a day's tour of Scottsdale, Arizona, the "West's Most Western Town"; a luncheon and fashion show in one of the world's great vacation centers; and scenic tours around the Valley of the Sun.

You are invited to enjoy the warm Arizona hospitality in an atmosphere of the legendary Old Southwest and to make this your fall vacation, combined with an opportunity to exchange technical information, in a truly western setting.

The details of the program are as follows:

Wednesday, October 18th:

Morning—Registration begins at 9:00 a.m.

Afternoon—Opening Session and Welcome to Arizona.

Evening—Exhibitors Cocktail Hour and Hospitality Night.

Thursday, October 19th:

Morning—*Titles, Boundary Surveys, Descriptions,* by William C. Wattles, Curtis M. Brown, and Burton Apker, Attorney for Title Company.

Luncheon — *Photogrammetric Developments, Past, Present, and Future,* by a representative of Fairchild Aerial Surveys, Los Angeles.

Afternoon — *Wilcox Playa Radar Geometric Fidelity Facility for Testing of Airborne Radar Equipment,* by a representative of M. M. Sundt Company, Tucson.

Current Survey Operations and Procedures, by a representative of the U. S. Bureau of Land Management, Phoenix.

Titan II Missile Site Survey Requirements, by a representative of the Martin Company.

Traffic Safety Control for Survey Parties, by Charles E. Haley, Traffic Engineer, Phoenix.

Evening—Western Barbecue and Entertainment.

Friday, October 20th:

Morning—*Air Photo Procurement Facilities,* by a representative of the Western Laboratory, Commodity Stabilization Service, U.S.D.A.

Radio Communications for Survey Parties, by a speaker to be announced.

Rapid Control Surveys With the Aid of Helicopters, by a representative of the Arizona Highway Department.

The Derivation of Quantitative Surface Data From Gross Sources, by George M. Goldberg, Engineering Specialist, Vought Aeronautics, Dallas, Texas.

Luncheon—*A Surveyors Liability,* by Robert O. Lesher, Attorney, Tucson.

Afternoon—*Electronic Computers for Surveying Computations,* by a representative of Technical Advisors, Inc., Phoenix.

Geodimeters in Private Practice, by James D. Carter, and AGA representatives.

New Reproduction Processes, by Steve McGill, Du Pont Corp., Salt Lake City, Utah.

Keeping Abreast of Instrumentation Developments, by Ed Grogan, Los Angeles.

Evening—Dinner Dance and Entertainment, Mountain Shadows.

Saturday, October 21st:

Morning—Tours to the Arizona Highway Department Photogrammetric Section; to the Arizona State Computer Center; through the Salt River Valley; and to other points of interest.

Exhibits close at 1:00 p.m., Saturday.

Hammond Celebrates Sixtieth Anniversary

On December 11, 1901, the year that Carrie Nation and the U. S. Steel Corporation were competing for space in the daily papers and your editor was struggling through the fourth grade, the firm of C. S. Hammond & Company was incorporated in New Jersey. This has been a family enterprise from the very beginning. Caleb Stillson Hammond, the founder of the company, was president until 1929; one of his sons, Caleb Dean Hammond, was president from 1929–1942; another son, Robert Sims Hammond, was president from 1942–1948; and Caleb D. Hammond, a grandson of the founder, has been president since 1948. Another grandson, Stuart L. Hammond, is now vice president and treasurer of the company.

The company records reveal that: "From April 1, 1901, to March 30, 1903, the company occupied desk space in an office at 233 Broadway. The first employee was a young draftsman who received $9.00 per week. He remained with the company for several years and finally became the map editor of the *New York Times.* During this time the personnel of the company varied from two to five, including the officers."

Hammond's records also show that in those early days the two map publications on which the members of the family worked very late were Hammond's Ready Reference Atlas for the Tourist and Traveler" and "Hammond's Reversible Map of the United States and the World on the Equivalent Projection." On the reverse side of the map was printed a 42×60-inch map of the United States, showing all counties and all railroad routes. This was the period of greatest railroad expansion and a map showing every mile of railway was much needed. The first order of considerable size which Mr. Hammond secured was from the Chicago and Northwestern Railroad, and the order was filled in April 1902.

The Hammond Company is credited with many "firsts" in the mapmaking business. One of them was the establishment in 1911 of a retail store for the sale of maps. That store was located in the Hudson Terminal, and today is still doing business at 1 East 43rd Street.

The Hammond organization has established the Caleb Stillson Hammond Memorial Scholarship in Cartography at Northwestern University as a contribution toward better mapmaking.

IT IS NOT TOO EARLY TO BEGIN PLANNING
TO ATTEND THE 1962 MEETINGS
SHOREHAM HOTEL, WASHINGTON, D. C., MARCH 11–17 1962

Now Hear This

Drift bottles released by the Coast and Geodetic Survey Ship *Explorer* in Mexican waters have been recovered in Ireland.

A *Mathematical Handbook* of vest-pocket size and containing 64 pages is available from Geo-Optic and Paper Corp., 149 Church St., New York 7, N. Y. The booklet contains a variety of tables, formulas, equivalents, etc., which, though they will not do away with the need for existing publications, could augment these and be quite useful when traveling or in the field.

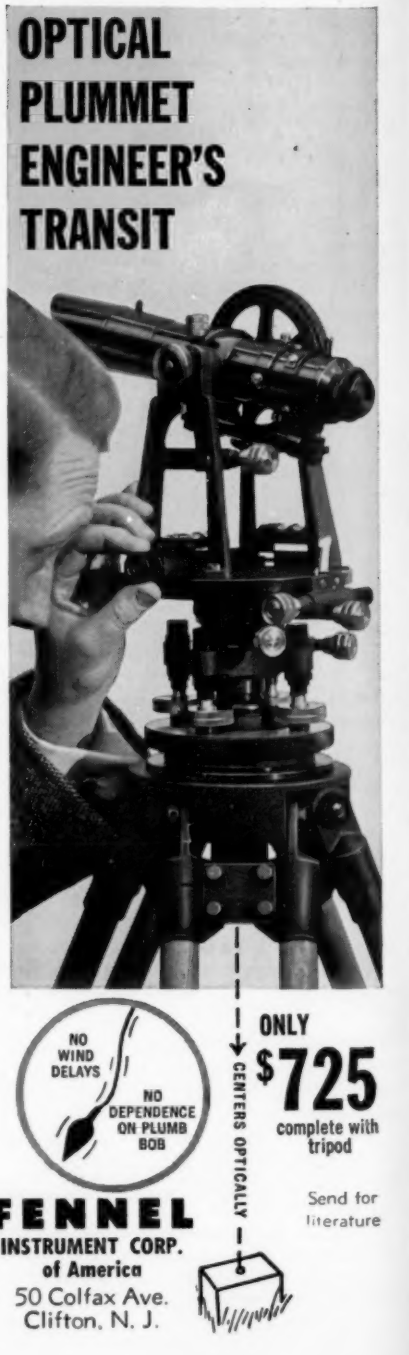
The Ford Foundation has granted $4,350,000 to strengthen graduate study and research in the College of Engineering at Cornell University, to contribute toward the endowment of 11 professorships, help provide substantial graduate fellowships, loan assistance, and additional facilities for study and research.

A four-year geodetic survey of the Blue Nile River basin in Ethiopia, which will eventually pave the way for the mapping and development of that remote area by the Ethiopian Government, has just been completed by technicians of the Coast and Geodetic Survey. The project established 365 geographic positions and 965 bench marks and covered more than 120,000 square miles of rugged plateau country in the most modern survey of its kind to be made in Africa.

A modern network of earthquake recording stations, spanning six continents, will be instrumented by the Coast and Geodetic Survey, beginning in mid-1961. Information gathered from this world-wide network will provide data on the nature, location, and frequency of world earthquakes that may ultimately permit prediction of destructive shocks. With financial support from the Advanced Research Projects Agency, Department of Defense, Coast and Geodetic Survey personnel will visit 65 countries and islands to install modern seismic equipment at 125 existing earthquake recording stations.

The Geological Survey of Canada scheduled 102 parties for geologic and geophysical field work throughout the Dominion during the 1961 season.

A cumulative index titled *Publications 1904–1960* has just been published as a new edition of the catalog of publications of the Engineering Experiment Station of the Uni-



versity of Illinois. It lists available publications by both author and subject headings, gives prices of publications and reproductions, and a list of publications by departments. It also describes the proper procedures for ordering Experiment Station publications or microfilm and photoprint reproductions of publications. The 43-page catalog is available free of charge from Engineering Publications, 114 Civil Engineering Hall, Uiversity of Illinois, Urbana, Ill.

On June 14 at 10:30 a.m., Secretary of Commerce Luther H. Hodges broke ground for the new National Bureau of Standards Laboratories at Gaithersburg, Maryland. The ceremony signaled the initial construction phase for a 20-building, $104 million research facility which will permit complete relocation of the Bureau from Northwest Washington to the 555-acre site in Montgomery County.

American Society for Engineering Education has passed the 10,000 mark in membership. That organization was started in 1893. ACSM started in 1941 and now has nearly 6,000 members. Let's see that it doesn't take us until the year 2009 to get to the 10,000 mark.

Eighty-two field parties comprising some 1,500 surveyors, hydrographers and supporting personnel from the Surveys and Mapping Branch of the Department of Mines and Technical Surveys fanned out across Canada and far into the Arctic during the summer of 1961 to continue the tremendous task of surveying and mapping that country's land areas and the charting of its inland and coastal waters.

The American Society for Testing Materials has changed its name to the American Society for Testing and Materials, to emphasize its interest in materials as well as the testing of materials.

Buff & Buff Manufacturing Company has now added the complete line of Breithaupt-Kassel instruments to its own line of established products.

A new Decimal Equivalent Chart (DC-2), designed for quick conversion of both Birmingham Wire Gauges and fractions of inches to decimals, is available, without charge or obligation to interested parties within the construction industry, from the Ohio Seamless Tube Division of Copperweld Steel Company, Shelby, Ohio. The chart, 11 × 14 inches in size and printed on coated heavyweight card stock, shows both the wire gauges and fractions in a color-position code for rapid identification.

SAVE TIME

ON PRELIMINARY AND SUPPLEMENTAL SURVEYS WITH A

BRUNTON POCKET TRANSIT

it's...

easy to carry
easy, fast to use
made to last a lifetime

Made in U.S.A. by

WM. AINSWORTH & SONS, INC.
2151 LAWRENCE ST. • DENVER 5, COLORADO

Write for free booklet

Name.....

Address.....

.....

1962 ACSM-ASP CONVENTION
Consecutive Meetings and Co-Exhibits

ACSM Twenty-second Annual Meeting, March 11, 12, 13, 14
ASP Twenty-eighth Annual Meeting, March 14, 15, 16, 17
Exhibits, March 13, 14, 15

NOW IS THE TIME

Make your plans now to attend the 1962 convention. This activity affords the best opportunity of the year to see the latest in equipment, hear about new techniques, and meet with old friends again.

This year's convention promises to be the best ever—don't miss it.

EXHIBITORS—Exhibit space is available now. Please contact Exhibits Chairman, Chester C. Slama, 818 Brice Road, Rockville, Maryland, for full information.

F. H. PICKERING
Chairman, Publicity Committee
1962 ACSM-ASP Convention

Notice—to ACSM Members and Officers:

The ACSM Twenty-second Annual Meeting will lead off in the 1962 ACSM-ASP Convention at the Shoreham Hotel, Washington, D. C., during the week of March 11, 1962. The ACSM meeting opens on Monday, March 12, 1962, and continues until noon on Wednesday, March 14, 1962.

All divisions should finalize and be prepared to submit any items of business to the ACSM Annual Business Meeting, which is scheduled for early Wednesday morning, March 14, 1962.

Please make your plans and shape your programs accordingly.

JOSEPH P. DUNICH, *Chairman*
ACSM Twenty-second Annual Meeting

WALTER S. DIX
Executive Secretary, ACSM